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AUTHOR Travers, Kenneth J.; Westbury, Ian
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ABSTRACT

Between 1980 and 1982, the International Association for the Evaluation of Educational Achievement (IEA) Second International Mathematics Study (SIMS) collected data on mathematics curricula, teaching practices, and achievement from samples of students, teachers, and schools in 18 countries. This material is a technical supplement describing the curriculum and organization of mathematics in each participating system in a way that permits interpretation of the "outcomes profile" of each system. Chapters included are: (1) "System Profiles" (describing school systems, teacher qualifications, mathematical content/materials, and examinations and control in each of 18 countries); (2) "Cognitive Item Tables"; (3) "Definitions of International Subtests"; (4) "Appropriateness Ratings Tables"; (5) "Indices of Intended Coverage"; (6) "Teacher Opportunity-To-Learn Ratings Tables"; and (7) "Indices of Implemented Coverage." (YP)

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Supplement

to

The IEA Study of Mathematics I:

Analysis of Mathematics Curricula

Kenneth J. Travers

and

Ian Westbury

University of Illinois at Urbana-Champaign

College of Education

University of Illinois at Urbana-Champaign

1989

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PREFACE

Between 1980 and 1982, the International Association for the Evaluation of Educational Achievement (IEA) Second International Mathematics Study (SIMS) collected data on mathematics curricula, teaching practices, and achievement from samples of students, teachers, and schools in 20 countries or school systems. SIMS was conducted at two grade levels, Population A in which students were (typically) in the national grade in which the modal age was 13, and Population B where students were taking a most advanced, pre-university course(s) in school mathematics their systems offered.

The following school systems participated in one or another of the SIMS studies (the population levels sampled are in parentheses):

Belgium (Flemish) (A, B)
Belgium (French) (A, B)
Canada (Britich Columbia) (A, B)
Canada (Ontario) (A, B)
England & Wales (A, B)
Finland (A, B)
France (A)
Hong Kong (A, B)
Hungary (A, B)
Israel (A, B)
Japan (A, B)
Luxembourg (A)
Netherlands (A)
New Zealand (A, B)
Nigeria (A)
Scotland (A, B)
Swaziland (A, B)
Sweden (A, B)
Thailand (A, B)
United States (A, B)

The international reports of SIMS are being published in three volumes as follows:

Kenneth J. Travers and Ian Westbury, The IEA Study of Mathematics I: Analysis of Mathematics Curricula (Oxford: Pergamon Press, 1989).

D. F. Robitaille and Robert A. Garden (Eds.) The IEA Study of Mathematics II: Contexts and Outcomes of School Mathematics (Oxford: Pergamon Press, 1988).

Leigh Burstein (Ed.) The IEA Study of Mathematics III: Student Growth and Classroom Processes in Lower Secondary Schools (Oxford: Pergamon Press, in preparation).

This volume is a technical supplement to the first volume in this series but, at the same time, it can be seen as a supplement to all the volumes in the series of SIMS reports. Volume I seeks to describe the curriculum and organization of mathematics in each participating system in a way that permits interpretation of the 'outcomes profile' of each system. This supplement contains a set of detailed 'country profiles' describing the contexts of the populations studied (and sampled) in each system, a comprehensive description of the pool of items used to create the cognitive tests used as the principal test of outcomes for the study, and a set of tables describing the emphases found in the curriculum of each SIMS system.

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System Profiles: Elizabeth Oldham, Peter M. Staples, James J. Hirstein, Gullayah Dhompongsa, Nongnuch Wattanawaha, Chantenee Indrasuta, Ian D. Livingstone.

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Like all of the volumes in this series of reports, this supplement could not have been prepared without the unstinting assistance of the SIMS National Research Coordinators and the International Coordinating Center in the New Zealand Department of Education directed by Roy W. Phillipps and Robert Garden. We must again acknowledge that assistance.

Ian Westbury

Kenneth J. Travers

Abbreviations for Educational Systems

Belgium (Flemish)	BFL
Belgium (French)	BFR
Canada (British Columbia)	CBC
Canada (Ontario)	CON
England and Wales	ENW
Finland	FIN
France	FRA
Hong Kong	HKO
Hungary	HUN
Ireland	IRE
Israel	ISR
Japan	JPN
Luxembourg	LUX
Netherlands	NTH
New Zealand	NZE
Nigeria	NGE
Scotland	SCO
Swaziland	SWA
Sweden	SWE
Thailand	THA
United States	USA

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1. System Profiles

The system profiles offered here report the situation in each system at the time of testing within the Study, viz., 1980-82.

1.1 BELGIUM (Flemish and French)

I. School System

Belgium has four linguistic areas: French, Dutch, German and bilingual French-Dutch. Education is based on a monolingual principle and there are three cultural communities: French, Flemish, and German.

Freedom of education is specified by the Belgian Constitution, with the result that schooling is organized by several different bodies: the State, Provinces, communes, and free institutions (chiefly Catholic). The schools have a common structure. Children aged 2½ to 6 may attend pre-schools, and most of them do so. Schooling is compulsory from 6 years of age; there are primary schools for children aged 6 to 12, and secondary schools for those aged 12 to 18. The minimum leaving age is 14, but this is being raised to 18; currently most students stay in school well past the minimum age.

A fundamental reorganization of secondary education has been taking place since 1971. The traditional system with distinct General, Technical, Artistic and Vocational tracks has been gradually replaced by Reformed Secondary Education (RSE). Reformed Secondary Education, designed to bring about greater democratization of education and to simplify its administrative structure, was introduced by law in 1971 and by 1975 was established in all state schools. Both systems contained four programs or streams: General Secondary, Technical, Artistic and Vocational, but under RSE, the distinctions between general, technical and artistic education have been minimized.

II. Teacher Qualifications

Teacher education in Belgium is provided by special higher education institutions and by the universities. The universities offer four-year courses that train teachers for upper secondary schools. Other teachers--those for pre-school, primary, lower secondary, and technical education--are trained by means of short (chiefly two-year) courses at the higher education level; there are separate diplomas for each category of teacher.

For lower secondary school teachers, options for study are available in the fields of mother tongue, history, modern languages, mathematics, exact sciences and geography, physical education and biology, and art. For those

who wish to teach at the upper secondary level, studies at university are required. Students take courses for a "license" in their specialist subjects, and for the last two years they take supplementary courses in teacher training. Teacher education is under review and some universities have already intensified their training.

III. Mathematical Content/Materials

State curricula are generally drawn up by groups consisting of inspectors, teachers, and representatives of parents' associations. Other organizing bodies (Provinces, Communes and free institutions) can either adopt the State curriculum, or they can submit their own for the approval of the Minister for Education.

Following the pioneering work of Professor G. Papy and his center at the University of Brussels, a "modern" mathematics curriculum was officially introduced into the schools in 1968. All organizing bodies were involved the reform activity and much effort has gone into spreading the new curriculum through the secondary schools. This curriculum represents many changes in content and emphasis when compared with the previous courses. Conventional arithmetic has almost totally disappeared, its place being taken by the theory of numbers (natural, whole, rational, real, and complex). Algebraic calculations are still taught, but they have been reduced to an minimum; new emphasis has been given to such algebraic structures as groups, fields, vector spaces, and matrix calculations. Geometry, the topic of greatest reform, is approached analytically rather than descriptively. Analysis has been retained at the upper levels, although the sequencing of some topics has been changed, and new topics in integration have been introduced.

IV. Examinations and Control

State schools follow an official curriculum established by the Ministry of Education. Catholic schools have their own curriculum committees but, as they are subsidized by the state, they are required to follow a curriculum that corresponds with that approved by the Ministry of Education.

At the primary level, regional examinations may be organized by inspectors of schools in each canton. Students can obtain a "certificate of primary education" at the end of primary education, but this examination is

optional. In the Catholic schools, examinations in mother tongue and mathematics are required. The results of these examinations are mainly used for educational research purposes.

At the secondary level, examinations are organized at the school level. As a guarantee for standards, there is a jury, a commission d'homologation, which validates the examination and the quality of teaching. The jury checks that legal conditions have been fulfilled; it tries also to determine the level of teaching for a sample of classes or students by looking at student schedules, examination papers, and workbooks. The school certificate must be "homologated" if a student wishes to use it for applying to a university or for entry to public administration. The jury is independent and controls private schools as well as state schools. Two Examinations Commissions, one for general secondary education and one for art and technical education, also allow secondary students to obtain certificates and diplomas for entrance to higher education. This route is chosen by students who have not proceeded through the usual path for secondary education (for example, through independent study).

Any secondary school graduate has the right to attend a university but some faculties, such as engineering, may require a further examination for admission. Entrance to a particular university may also be obtained by passing an examination offered by that university.

V. Differences Between Belgium (Flemish) and Belgium (French) School Systems

Most important features of school organization are common to both parts of Belgium. However, important differences do exist the respective importance of the organizing bodies (Catholic schools predominate in the Flemish part of Belgium; States, Provinces and Commune schools are more numerous in French Belgium).

Slight differences may exist in the number of periods devoted to school subjects, the curriculum, in-service training opportunities, and evaluation procedures.

1.2 CANADA (BRITISH COLUMBIA)

I. School System

All provincial (state) schools are comprehensive, offering courses for all levels of ability and various programs are available for different student interests. Elementary (primary and intermediate) schools, covering seven grades, are attended from age 6 through age 12. Secondary education is provided for five years by three types of school: junior secondaries (providing the first three years of secondary school), senior secondaries (providing the last two years of secondary school), and secondaries (combined schools providing all five years). Attendance is compulsory until age 16 (i.e., through the first three years of secondary education). About 85 percent of the student population remains in school beyond age 16 to complete the final two years of secondary school.

II. Teacher Qualifications

Over 99 percent of teachers have professional teacher training and about 95 percent of those with professional training also have a university degree. These are typically bachelors degrees, involving the equivalent of four years of undergraduate work in a subject matter major and one year of teacher training. Until about ten years ago a Standard Teaching Certificate could be obtained after two to three years of professional teacher training without a university degree. Older teachers qualified in this way account for five percent of teachers with professional training.

III. Mathematical Content/Materials.

British Columbia has a provincial curriculum guide in mathematics. It was revised in 1976 and utilizes a number of strands combined in a spiral approach. Some local school districts also provide curriculum guides. All Population A students take essentially the same mathematics course, although local adjustment to meet a range of student abilities is possible since the curriculum guide provides for multiple textbooks.

Senior secondary (hence, Population B) students may choose from a wide variety of courses to meet graduation requirements. Mathematics at this level consists of a sequence of two elective courses (one per grade level).

Two courses, Probability and Statistics 12 and Geometry 12 have been available for several years as electives in the final year; however, they are offered in very few schools. (In 1981, for example, less than 5 percent of Population B students took either of these courses.) The most popular terminal mathematics course is Algebra 12 taken by about 40 percent of Population B students; this course exists in a basic format and an enriched format. The 1976 curriculum guide revision deleted a number of topics (matrices and determinants, introduction to calculus, etc.) to form the basic format. The enriched format includes some of those topics (but no calculus) as well as others (vectors and polar coordinates) and teaches the concepts from the basic format at a higher level of sophistication. Thus, mathematics offerings are typically uniform, with all differentiation provided primarily by the choices of programs, courses and formats at the senior secondary level, but within a comprehensive school system.

While course content, objectives, and textbooks are determined by the curriculum guide, sequencing and emphasis can be modified somewhat by choices among the several textbooks available, and freedom is given to the teacher in choice of teacher methods, in testing, and in grading.

IV. Examinations and Control

In 1980-81 no province-wide examinations were used for certification or selection purposes but provincial assessments were conducted every 4 years in grades 4, 8 (Population A) and 12 (including Population B). The assessment results helped to identify strengths and weaknesses in the system and aimed to provide direction for curriculum committees and help teachers decide topic emphasis and priority. (As of the 1983-84 school year, province-wide examinations in 13 "academic" subjects have been mandated at the Grade 12 level. The examination counts for 50 percent of the student's final grade, with the school assigning the remaining 50 percent.)

The province's Ministry of Education both determines the curriculum and develops and administers the assessments. However, practicing teachers do the majority of the work of actual curriculum development. Thus, a fair amount of control is exerted through the provincial curriculum guide, although significant teacher influence is present because of the cooperate nature of curriculum development and the provision for variation through multiple approved textbooks.

The Ministry of Education also makes available to schools Classroom Achievement Tests in mathematics for use at their discretion. These tests are keyed to the curriculum, and norms are provided to facilitate interpretation of raw scores.

There are non-compulsory "scholarship" examinations for Population B students in all academic subjects in the curriculum. Students select four subjects and those who are successful are awarded monetary grants to meet the cost of further education. The content of these examinations exerts considerable influence on the implemented curriculum.

1.3 CANADA (ONTARIO)

I. School System

Government of Ontario-funded schools (Public [grades K-13] and Roman Catholic Separate [grades K-10]) account for more than 95 percent of the school population for ages 5-16. The Roman Catholic schools (Separate Boards) contain approximately 30 percent of the age 5-13 cohort, decreasing to 10 percent for ages 14-15. Private schools account for approximately two percent of the age 5-14 population, rising to 6 percent for the ages 16-17; part of this increase is due to enrollments in the Separate Board grades 11-13 which, not being government-funded, are considered private.

French-language elementary schools, operated, for the most part, by Separate School Boards, are attended by five percent of the age 5-13 population. Three percent of the age 14-17 population attend publicly supported French-language high schools.

The Ontario Ministry of Education provides curriculum guidelines according to a divisional structure. Primary (junior kindergarten-grade 3), Junior (grades 4-6), Intermediate (grades 7-10) and Senior (grades 11-13). However, this structure is not reflected in the organization of individual schools (K-6, 7-10, 11-13, etc.) and in reality a variety of grade-level groupings exist. All schools in the province attempt to conform to ministry guidelines for their curriculum and all secondary schools wishing to offer a graduation diploma approved by the Ontario Ministry of Education must be inspected.

Virtually all Public, Separate and Private secondary schools are comprehensive, with most offering instruction at three levels beginning at grade 9: Advanced, General and Basic; a fourth level, Modified, was added in 1980. Though all schools offer Advanced and General level courses, the Basic and Modified levels may be more typically found in public secondary schools.

Students may leave school when they reach the age of 16, but 92 percent of 16-year-olds continue to attend. At the completion of grade 12, the Ontario Secondary School Graduation Diploma (OSSGD) is conferred. The Ontario Secondary School Honours Diploma (OSSHGD), requiring the completion of six honours courses in grade 13, is normally required for admission to

an Ontario university but not for universities in other provinces. Approximately 62 percent of the age cohort achieve the OSSGD and 24 percent the OSSHGD. Approximately 14 percent of the age cohort register in an Ontario university the year following their graduation.

II. Teacher Qualifications

Teacher-training in Ontario is the responsibility of faculties of education in provincial universities. Two types of program exist: consecutive training in which candidates attend a faculty of education for a one-year Bachelor of Education degree following receipt of a university bachelor's degree, and (less common) concurrent training in which a Bachelor of Education is earned as the main undergraduate degree. In either case, faculty programs must comply with Ministry regulations and standards in order to award the Ontario Teaching Certificate which is necessary for teaching in provincially-funded schools.

At the Senior and Intermediate levels prospective teachers must elect two areas of specialization. Selection of mathematics education as the main option at the Senior level usually requires the successful completion of five university-level mathematics courses and a Faculty of Education mathematics teacher program. Selection of mathematics education as the secondary option at the Senior level or as an Intermediate option requires two university-level mathematics courses and completion of a training program. Teaching at the Primary or Junior level requires a Bachelor of Education earned in either a consecutive or concurrent program.

In Ontario most grade 7 and 8 students are taught mathematics by teachers who are responsible for the entire curriculum.

III. Mathematical Content/Materials

The Ministry of Education issues official curriculum guidelines and lists of approved textbooks, films, tapes, kits and other materials. All Population A (grade 8) students follow the prescribed course which consists of core and optional topics. No formal tracking or streaming is provided for in grade 8 (in contrast to grades 9 and 10) though optional topics permit considerable variety from class to class. Mathematics is a required subject through grade 10.

Senior Guidelines, first issued in 1972, cover grades 11-13. At grades 11 and 12, the mathematics courses offered are Foundations of Mathematics (Advanced level) and Applications of Mathematics (General level). Though not required to do so, virtually all students enrolled in grade 11 take either Foundations (47%) or Applications (48%) courses. Forty-one percent of grade 12 students enroll in the Foundations course and 35% in Applications.

Four grade 13 mathematics courses are offered: Relations and Functions (taken by 65% of students), Calculus (55%), Algebra (28%), and Mathematics of Investment (8%), and students may include all four in the six credits required for Honours graduation. Fifty-five percent of the grade 13 population enroll in two or more grade 13 mathematics courses and approximately twenty percent take three.

Since the Ministry of Education approves all textbooks used in schools and regularly monitors implementation of the guidelines, it exerts considerable influence over course content throughout the Province.

IV. Examinations and Control

In 1968, a province-wide examination for the grade 13 diploma was replaced for university and college entrance purposes by the Ontario Tests for Admission to College and University. This program was discontinued in 1974, and since then no province-wide examination system has been in effect, though local school boards may administer standardized and locally prepared achievement and ability measures.

1.4 ENGLAND AND WALES

I. School System

Most schools in England and Wales are 'maintained' by central and local government funds, although there is a small number of independent fee-paying schools.

The structure of the maintained system has altered considerably in the last 40 years. In the late 1940s, children entered primary school in the term in which they reached their fifth birthday, and stayed until the age of 11; they were then selected for one of three types of secondary school: grammar school (providing academic education), secondary modern school (providing less academic education, typically up to the school leaving age of 15), and technical school (geared to technical and craft studies; in practice not many such schools were available). By 1980 the tripartite system has been largely replaced by comprehensive schools, catering for all children from the age of 11 (typically to a maximum of 18) spanning several grades.

The first comprehensive schools tended to be large. In an effort to reduce their size, various local Education Authorities have altered the ages of transfer. For instance, in some areas there are middle schools, covering the grades for ages 8-12, 9-13 or 10-14; in others, the final two years of the 11-18 comprehensive school ("the sixth form") have been split off to create sixth form colleges.

Some 17 percent of the age cohort remains in secondary school until the age of 18. The school leaving age was raised to 16 in 1973.

II. Teacher Qualifications

Two structures for secondary teacher education--"concurrent" and "consecutive"--exist side in England and Wales. In the concurrent system, students enter education courses--leading to a Bachelor of Education degree --as soon as they leave secondary school; they follow pedagogical and professional studies alongside other academic disciplines. Those receiving their teacher education consecutively take a first degree which does not include educational studies, and then complete a one-year post-graduate diploma in education. Post-graduate training has always been encouraged;

but it was not a requirement until 1974 for teachers in secondary schools, and it has, at times since then, been waived for teachers of mathematics.

III. Mathematics Content/Materials

In theory, there is great curricular freedom in England and Wales, but in the actual situation this freedom is affected by the demands of the examination system. From the early 1960s, "modern" syllabuses were introduced in some schools, while others chose to retain the traditional work. Traditional, modern and "compromise" syllabuses still exist side by side, and are taught to the full ability range, at least at lower secondary level; formerly, many second-level students did not proceed beyond arithmetic.

Secondary textbooks are prepared commercially, and selected--typically --by the head of a school's mathematics department.

IV. Examinations and Control

In 1980-81 there were two examinations taken by pupils at the end of statutory schooling (that is, at 16). These were: the General Certificate of Education Ordinary Level ("G.C.E. O-level") and the Certificate of Secondary Education ("C.S.E."). O-level is taken by the top 25% of the ability range; C.S.E. was designed for the next 35%, although in practice the range is greater than this. There are several G.C.E. examining boards, generally associated with universities; similarly, there are several regional C.S.E. boards. Although each board typically offers more than one mathematics syllabus (spanning the "traditional/compromise modern" spectrum), there is a great similarity across boards between courses of the same "type."

In addition, there is a General Certificate of Education Advanced Level ("G.C.E. A-level") examination, taken by 18-years-olds. Typically, students take three subjects at this level. Those taking mathematics spend nearly one quarter of their time--or even, if they take mathematics as a "double subject," nearly half their time--on the subject.

1.5 FINLAND

I. School System

In Finland compulsory education continues to age 16. All children aged 7-15 years attend a general municipal comprehensive school containing 9 grades. The first six grades form the lower level where the curriculum is in principle the same for all students. At the upper level (grades 7, 8, and 9) students (in 1981-82) choose "sets" at different levels in foreign languages and mathematics (from the 1985-86 school year the sets were removed). Besides these sets, students can choose some elective subjects in grades 8 and 9. At present, students completing at least an intermediate course in the first foreign language and mathematics, and a longer course in the second foreign language, gain unlimited entitlement for further studies after comprehensive school. Otherwise they have only limited entitlement; for example, they are not eligible to enter senior secondary school.

After completing comprehensive school, students can continue their education in a senior secondary school (a 3-year academic upper secondary school), a vocational school (2- or 3-year), a commercial school or institute (3-year), or a technical school or institute (3- or 4-year). After upper secondary school, students can go to a university, to a commercial or technical institute, or possibly to some other specialized institute at the university level.

II. Teacher Qualifications

Mathematics teachers complete a 3-4 year Bachelor of Science degree or a 5-6 year master's degree at a university. The degree consists of three subjects, usually mathematics, physics and chemistry. A teacher who has a master's degree is required to have a major, called laudatur, in mathematics and a minor, called cum laude approbatur, in two other subjects. Subsequently, teacher candidates spend one year at a teaching training college to acquire formal teacher qualifications.

III. Mathematical Content/Materials

Finland has a national syllabus in mathematics for both the comprehensive school and the secondary school. The comprehensive school syllabus was

prepared in 1970, and has been developed further in a draft syllabus covering the subject matter common to all students taking comprehensive school mathematics (the core curriculum of 1976). All students in Population A (comprehensive school 7th grade) study mathematics either in the longer or shorter course. Grade 8 or 9 students may take a general, intermediate or advanced course in mathematics, one of the three sets mentioned above.

The upper secondary school syllabus for mathematics was prepared in 1973 and published in 1974. Students may choose a long or short course. The short course requires 2½ periods a week for three years. The long course requires about 4 periods a week in each grade and is designed to prepare students for further training in mathematics, science and technology.

Teachers must use textbooks approved by the National Board of General Education and written on the basis of the national syllabus. For both the comprehensive school and upper secondary school there are many texts from which teachers can choose. The Matriculation Examination, at the end of upper secondary school, exerts a strong influence on the objectives and content of instruction at this level.

IV. Examinations and Control

The 3-year senior or upper secondary school culminates in the Matriculation Examination which consists of tests in four compulsory and two optional subjects. The tests are set by the National Matriculation Examination Board and are marked by teachers who return the papers to the Board for a second marking. Students who study the long course in mathematics are required to complete the mathematics test. Those who study the short course can choose between a mathematics test and a general paper (reaalikoe). Pass marks are graded either approbatur, lubenter approbatur, cum laude approbatur, magna cum laude approbatur, or, laudatur. At present, successful matriculants receive two certificates--the Matriculation Board Certificate and, from their own school, a Secondary School Leaving Certificate.

1.6 FRANCE

I. School System

Compulsory school attendance in France begins at age 6. Children attend a five-year elementary school from age 6 until age 10. At the end of elementary school, all students enter the first cycle of the high school (collège). The four-year collège is composed of two periods. At the end of the observation period (first two years) selection takes place; most students continue in the collège while others, depending on age and ability, are guided to pursue an efficiency certificate in a Professional Education Lycée (LEP). At the end of the collège, (ninth year), students move to the second cycle of high school (lycée) or to long-term professional training (in the LEP). The Lycée can be technical, classical (academic), or polyvalent (academic, but mainly economic and some technical).

In September 1981, the lycée underwent a reform. The first year (class de seconde) is the same for all students for the main subjects of mathematics, physical sciences and French. Several options are also available: for example, management, Latin, technology and art. This class is called second de determination. At the end of this first year, differentiation is made between students among several classes available. The structure of these classes is very similar to that of the classes prior to the reform. The main subjects are philosophy, economics, science or mathematics. However, mathematics is studied in every class.

II. Teacher Qualifications

After attending the lycée, prospective teachers attend a university, then obtain a teaching certificate through national competitions, examinations or teacher training schools. The diploma received determines the teacher's position, salary, and the number of classes that must be taught. The Teacher General Education Diploma (PEGC) requires two years of general university study and one year in a teachers college (Ecole Normale). These teachers may teach several subjects and teach only in the collèges. The certifie (CAPES) requires three years of mathematics at the university followed by a competitive examination during a fourth year of

pedagogical courses. Teachers holding a certifie teach mathematics courses in collèges or in lycées. The agregé requires four years of mathematics at the university followed by a fifth year that includes a national competitive examination. Agregé professors may teach mathematics in collèges, in lycées, or in the first cycle of universities. This is a very prestigous qualification attained by only 15 percent of teachers but every lycée would contain some such teachers.

III. Mathematical Content/Materials

Mathematics curricula are nationally determined for the collèges and lycées and are followed by both public and private schools. The number of hours taught in each subject is decided by the Ministry and no principal may modify it.

In the collèges, computation and geometry are taught simultaneously. The new curriculum (1977) emphasizes intuitive knowledge and recommends avoiding an axiomatic presentation of geometry.

In the lycées, curricula differ according to the section (or orientation). Section C (mathematics and physics) is the most prestigious mathematics curriculum with students taking 9 hours of mathematics per week. Section D (mathematics and natural sciences) students take 6 hours of mathematics a week. Lycée students in other sections take at least three hours of mathematics per week. Teaching in the lycées is usually more abstract than in the collèges, but the use of teaching aids is considered important.

IV. Examination and Control

Textbooks have a considerable influence on the orientation and order of presentation of material, but the content of mathematics is prescribed by the Ministry. National examinations are used to insure that the national content is followed. The Elementary Studies Certificate (CEP) is an examination of declining importance, but it is still used by some employers. The First Cycle Studies Certificate (BEPC) is not required to enter a lycée, but can be an important. It can be taken in the school or externally, administered through one of the educational regions (academies). The baccalaureate, obtained at the end of the lycée, is the first university examination, and is under the control of committees of

examiners chaired by university professors. Students successful in the baccalaureate can be admitted to the university in whatever subject they choose, but in practice, the choice of section in the lycée determines the type of university study which can be pursued.

1.7 HONG KONG

I. School System

Six grades of free and compulsory primary education are intended to begin at age six, though immigration enforces tolerance of late entry. For the majority, primary education is preceded by three years of fee-paying kindergarten education from 3 to 5 years.

At age 12+, on the basis of parental preference and academic ability, children are allocated to secondary schools. Most (89 percent in 1980) follow grammar school courses, some with a predominantly technical bias, while the remainder enter pre-vocational courses. Approximately 60 percent of those who complete form 3, the ninth and final year of free education, continue in subsidized or wholly fee-paying school places to take the Certificative of Education in form 5, two years later.

Grammar school courses may be offered in either Anglo-Chinese Schools (English language medium) or Chinese Middle Schools (Chinese language medium). Both Anglo-Chinese and Chinese Middle Schools offer post-Certificate of Education, pre-university courses, the former of one or two years, the latter of only one year's duration. These final, twelfth and thirteenth grades are known as form 6 and form 7 (or upper sixth).

II. Teacher Qualifications

Mathematics teachers in the lower grades of secondary schools (forms 1 to 3) tend not to have special qualifications in mathematics but are usually professionally qualified and to some degree specialized in mathematics and science teaching. Those at the upper levels (forms 4 to 7) usually hold university degrees in mathematics; an increasing number of teachers receive teacher training by way of one year's full-time, or two years of equivalent part-time, study.

III. Mathematics Content/Materials

Prior to the reform movement of the 1960s, mathematics syllabuses in grammar schools were based upon pre-war models. Great emphasis was laid on skill in computation and in recognizing "typical" problems in examinations, an emphasis which often led to rote learning and excessive drill.

In the summer of 1962 a seminar was organized during which new ideas and developments in mathematics education in the Western countries were first introduced to Hong Kong teachers. This work resulted in production of a course leading to a Hong Kong School Certificate (Grade 13) examination in mathematics. More recently, a provisional syllabus has been produced which seeks to bring together the most vital elements and insights from both the traditional and the modern approaches.

In the year of testing for SIMS, there were three mathematics syllabuses available in the Hong Kong School Certificate Examination: traditional, modern and provisional. The schools were free to follow whichever syllabus they choose.

Both examinations are administered by the Hong Kong Examinations. Authority, an autonomous public body. Many students also take the G.C.E. "A"-level examinations of the University of London, England. Since success in these examinations has very significant social and economic implications for the candidates, the curriculum and the teaching in the schools are dominated by them. Any curriculum revision incorporated into the examination syllabuses has a pronounced impact on the school curriculum.

IV. Examinations and Control

At the Population A level there are no national examinations. Teachers are free to determine their own teaching curricula, though there are published curricula recommended by the Government's Curriculum Development Committee. At the Population B level, the majority of students follow either a one-year course leading to the Higher Level Examination and entry to the Chinese University of Hong Kong, or a two-year course leading to the Advanced Level Examination and entry to the University of Hong Kong or to the Hong Kong Polytechnic.

1.8 HUNGARY

I. School System

Compulsory education in Hungary begins at age 6 and ends at age 16. Kindergartens are available for children aged from 3 to 6 years, and more than 80 percent attend. For those who do not, a one year preparatory program for five year-olds is available.

At age six, after being tested for school readiness, children begin compulsory elementary school. Those not ready for school take a one year postponement, returning to kindergarten or taking school preparatory courses. About 90 percent of seven year-olds are in school. Over 90 percent of those starting elementary school complete the eight grades. During the last four years of elementary school (grades 5 through 8) subjects are taught by specialist teachers.

Since schooling must continue until age 16, those who complete elementary school before that age and who do not go on to secondary school, must take part in "extension training" until age 16. But most (about 80 percent) of those in the age group who finish elementary school go on to a vocational school or four-year academic secondary grammar school. The goal of the latter is university matriculation, and this type of school is attended mainly by those aspiring to a university or college education, or by those undecided about their future after elementary education. Four-year vocational schools provide training for middle-level specialists in trades which demand some theoretical knowledge. Trade schools provide training for skilled workers not requiring a theoretical background.

II. Teacher Qualifications

In the first four years of elementary school, virtually every subject is taught by the same teacher. These teachers are trained in three-year teacher-training institutes which require matriculation from secondary school as a pre-requisite for entry. Grades 5 to 8 are taught by subject matter specialists, prepared in four-year teacher training colleges. Mathematics teachers often teach another subject, frequently physics or chemistry.

Secondary school teachers are trained at universities. The program of study lasts five years, during which they specialize in the teaching of two subjects. (Mathematics is usually coupled with physics.) The program of study for a mathematics major is composed mainly of higher mathematics and physics, psychology, and pedagogical and methodological subjects. All universities have "model secondary schools" attached, where students are able to practice teaching.

III. Mathematical Content/Materials

Over the past three decades, Hungary has undergone a series of curriculum reforms, affecting grades 1-8 particularly. At this level there is now a single, centralized curriculum, and teachers are required to use textbooks prepared and published by state enterprises.

For grades 9-12, there are nine types of curricula:

Courses a-f are for students of vocational secondary schools.

Course g (Basic Mathematics) is designed for students not specializing in mathematics. About 92 percent of the grade group follows this course, in both vocational and academic secondary grammar schools.

Course h (Special Mathematics I) is for students who take mathematics as an integral part of their studies, and provides opportunity to learn sophisticated mathematics. Although offered only to a few, this program contributes to the education of mathematicians and scientists.

Course i (Special Mathematics II) is for specially gifted students. Seven classes in the country are offered for students selected for their outstanding mathematical abilities.

Although new curricula were implemented for the secondary schools in 1979-1980, starting with grade 9, no major changes are envisaged until the mid-1980's, by which time students with the new primary school background will have reached secondary school.

IV. Examinations and Control

The widespread curriculum changes introduced in Hungary at intervals between 1946 and 1978 have affected all grades of the school system. Along with the curriculum reform, there has been some relaxation of control, and teachers in grades 1-8 are now able to work within broad guidelines around a compulsory core syllabus. At the secondary level teachers have been given

more freedom to use their own methods. For example, two sets of textbooks for secondary grammar schools have been provided, instead of one, as formerly. The teacher can choose between them. The first set is along traditional lines, while the second contains more experimental material.

After completing general school, nearly all students in Hungary go on to secondary school without the need to pass any examinations, but the type of school they may choose is strongly influenced by their school marks.

In all secondary schools, students in the fourth grade (17-18 year-olds) may take a final external examination, the "maturity" examination. Students at trade schools also sit for a final examination to obtain a certificate.

Students who wish to continue to tertiary education must pass an entrance examination with both oral and written sections. A total score is obtained by incorporating a component reflecting grades in secondary school. Minimum requirements for entry are determined by universities and colleges.

The data collected for SIMS reflect the situation in 1979-80 and 1980-81 regarding Population A and B, respectively. Recent changes include the abolition of Course h (Special Mathematics). The role of this course has been overtaken by additional courses of mathematics taught in virtually every secondary grammar school.

1.9 IRELAND

I. School System

Education in Ireland is compulsory between the ages of 6 and 15. However, most children start school in their fifth year, and more than half the cohort stays in school until the age of 17.

Children start in primary school, attending typically until they are 12 years of age. They then transfer to one of a number of types of post-primary school. Prior to 1960, two main types of school were available: Secondary schools (privately owned but funded mainly by public money, and offering an academic education), and vocational schools (owned by local Vocational Educational Committees, and offering education geared to entry to a trade). During the 1960s and early 1970s, attempts were made to bridge the gap between academic and non-academic education; the academic provision in the two types of school became more similar, though their management structures remained distinct. About the same time, some comprehensive schools were opened by the State. They were followed, in the early 1970s, by community schools, distinguished from the comprehensives by a different management structure, but intended to be comprehensive in curriculum and student intake. The three sectors--secondary, vocational and comprehensive/community--now exist side by side. Their respective enrollments at the time of SIMS testing were approximately 200,000, 60,000 and 23,000.

II. Teacher Qualifications

The typical mathematics teacher in a secondary, comprehensive or community school has a degree (not necessarily in Mathematics) and a Higher Diploma in Education (a qualification obtained by completing a one-year graduate course in the theory and practice of education). Mathematics teachers in vocational schools must be graduates, and some Vocational Education Committees demand that Mathematics must be a substantial part of the degree course; the Higher Diploma is not necessary, but a number of teachers have the qualification. Traditionally, secondary teachers do not specialize; many teach more than one subject.

III. Mathematical Content/Materials

In 1980-82, syllabuses were prescribed and national examinations controlled by the Department of Education. This made the system essentially centralized despite the varied ownership and management structures. Mathematics is a required subject in the junior cycle of secondary schools; it is not compulsory in the senior cycle, but is taken by more than 90 percent of the in-school cohort.

There are three main courses in mathematics at post-primary level, each associated with a different national examination. The first two, the Intermediate Certificate and the Day Vocational (or Group) Certificate, belong to the junior cycle of post-primary education; the third, for the Leaving Certificate, is a senior cycle course. The Intermediate and Leaving Certificate courses are offered at two levels of difficulty, "Lower" and "Higher" for the Intermediate, and "Ordinary" and "Higher" for the Leaving. The content of all the courses has undergone a series of reforms in the last twenty years, and further periodic changes are envisaged.

Textbooks are produced commercially, but are unlikely to be adopted by many schools unless they closely mirror the official courses.

IV. Examinations and Control

In 1980-82 the Department of Education controlled the three national examination: the Group Certificate (taken typically after two or three years of post-primary education), the Intermediate Certificate (taken after three or four years of post-primary education), and the Leaving Certificate (taken, usually, two years after the Intermediate Certificate). In Mathematics, about 80 percent of the age cohort take the Intermediate and about 15 percent take the Group Certificate (with some students taking both, the Group Certificate one year and the Intermediate the next); over 90 percent of those still in school take Mathematics for the Leaving Certificate. The examinations, which are fully external, have a very great backwash effect because of their importance for entry to employment and to higher and further education.

1.10 ISRAEL

I. School System

Compulsory education encompasses the ages 5-16 years and is free until the end of the secondary school (grade 12). Within Israel there are separate Jewish and Arab systems with the medium of instruction being Hebrew and Arabic respectively but both systems are supervised by the Ministry of Education and Culture. Only the Jewish system was included in SIMS.

In this system, two parallel school structures are to be found. The first structure comprises an 8-year primary school cycle, followed by a three-track secondary cycle:

(a) academic or university bound;

(b) vocational--a small cluster of university-bound classes and a majority of terminal high school classes;

(c) agricultural--including both university- and non-university bound classes.

The second structure, known as the Reform Structure, and introduced in 1968, comprises a six year elementary school, followed by a six year secondary school with two departments:

(a) lower three-year middle school department--non-selective, comprehensive;

(b) upper three-year department--academic and non-academic tracks.

The reform is being implemented rather slowly throughout the country, owing to budgetary difficulties. In 1980 approximately 50 per cent of the eighth grade students were encompassed within the Reform Structure.

II. Teacher Qualifications

Primary School

In grades 1-4 the homeroom teacher teaches all subjects including mathematics. In grades 5-8 (and in the reform system, in grades 5-6) either home room teachers or teachers having some specialization in the subject teach mathematics.

Teacher training institutes for primary school teachers are postsecondary but mostly without academic status. They grant teachers' diploma after

three years of study. Recently institutes, which meet criteria specified by the National Council for Higher Education, may apply for permission to open a fourth year of study for students excelling in their studies who may receive a B.Ed.

Secondary Schools

Secondary schools teachers obtain training in universities. For the lower Secondary grades, a bachelor's degree in the Department of Mathematics is required. Those who intend to teach in grades 11-12 must earn an M.A. degree in mathematics. In addition to these academic degrees, a diploma course in a School of Education is required.

Recently Schools of Education have opened Departments of Mathematics Teaching. Admission to these departments is granted to those who have a B.A. degree in mathematics. The departments grants an M.A in Mathematics Teaching.

Middle Schools

Teachers in Middle Schools are expected to have training equal to that of Secondary School teachers, or alternatively extended mathematics studies in non-academic teacher training institutes.

III. Mathematical Concept/Materials

At the elementary and junior high school levels there is only one course in mathematics which all students must take. At the elementary level the course is called Arithmetic and Geometry and at the Junior High school level Algebra and Geometry.

At the tenth grade level, there is again only a single course, which all students take, but from the eleventh grade, a track system starts in most schools. About three-fifths of the students follow one of the two science tracks (physics or biology) and the remainder follow the humanistic and social science track. Algebra and trigonometry are offered in all tracks but the syllabuses vary. Calculus is taught to students in science tracks only, and analytic and solid geometry further restricted to students in the physics track.

IV. Examinations and Control

There is an official national curriculum which affects course content, sequence and emphasis, textbooks, teaching methods, and examinations. Supervisors and instructors are provided to assist teachers in following the syllabus, but do not have a large impact on what goes in schools.

The general framework for school examinations has not changed since 1965. It is in the hands of an external examining body operating within the Ministry of Education. At the Population B level, examination papers in mathematics are set within the Ministry, and marked (anonymously) by experienced mathematics teachers. The Maturity Certificate is awarded to students at the end of secondary school, on the basis of a composite of their school mark in grade 12 and their grades on the examination paper. The examination has a major bearing on the material taught to students in grades 10-12, but has a much smaller "backwash" effect on students in Population A (grade 8).

1.11 JAPAN

I. School System

Compulsory schooling in Japan begins in the year following a child's sixth birthday. After completing a six-year elementary school, children go on to a three-year lower secondary school. While public, national and private schools are available, over 96 percent of students attend public schools run by local government authorities through lower secondary level. Selective national schools also exist, but less than 1 percent of students attend these. Attendance is compulsory for all children through the first nine years.

Of those who complete lower secondary schooling, over 94 percent continue to upper secondary schools. Some differentiation into specialized schools takes place at this point (68 percent of the students are in General Secondary Schools). At this upper secondary level, approximately 70 percent of the students attend public schools and 30 percent private schools.

II. Teacher Qualifications

Minimum requirements for teachers vary according to school level and class of certificate. For those intending to teach at the lower secondary level, a second-class certificate can be obtained by two years' study beyond the upper secondary school. Those desiring higher teaching qualifications may obtain a first-class lower secondary or second-class upper secondary certificate (equivalent to a bachelor's degree) after four years' study. The first-class upper secondary certificate requires two years beyond the Bachelor's degree, studying exclusively mathematics subjects.

III. Mathematical Content/Materials

The course of study is prescribed by the Ministry of Education and is followed by all schools, public and private. A revised course was implemented in 1980 in elementary schools, 1981 in lower secondary schools and 1982 in upper secondary schools.

Mathematics in the upper secondary schools follows a course structure. Students first take General Mathematics or Mathematics I, then Mathematics IIA (non-academic) or Mathematics IIB (academic). The

academic program concludes with Mathematics III. Applied Mathematics is provided for pupils in vocational courses, where students learn the advanced topics needed in their specialist areas. The academic series (I, IIB, III) is completed by about 30 percent of students entering general secondary schools and blends topics from algebra, geometry, analysis, probability and statistics.

Most textbooks are compiled by commercial publishers in accordance with the Course of Study and must be authorized by the Ministry of Education for school use. For public schools, the selection from available textbooks is made by local boards of education. Private schools may make their own selection.

IV. Examinations and Control

Examinations are given for entry to national and private schools at the elementary and secondary levels. These examinations are competitive, and the number of places is limited. Admission to upper secondary schools and universities is also based on a competitive entrance examination. Students who fail the entrance examination to their desired university often continue their preparation after graduation from senior secondary school to try again the next year. In many large cities there are private schools preparing students for such examinations. Private tutoring classes are also becoming popular with elementary and lower secondary pupils to help them avoid failure on upper secondary entrance examinations.

In 1977, the University Entrance Examination Center was formed to develop an entrance examination, put in force from 1979, that could be used by universities throughout the country. Studies may be admitted to university on the basis of achievement on the Center Examination, and/or on the basis of results on a second examination given by each university.

1.12 LUXEMBOURG

I. School System

Ten years of schooling, beginning at the age of five years, are required in Luxembourg: one year of pre-school, six years of primary school and three years in one of four parallel school types of different lengths and aims. The Lycée (secondary general school), of seven years, prepares for the university. After the first year students can choose between a humanistic section (with Latin) or a modern language section. After the third year there is a second choice among different sub-sections: languages, mathematics, sciences and economics. The Ecole Moyenne, of five years' duration, prepares for careers in the public and private sector and business. Other Secondary Professional Schools prepare craftsmen and skilled workers for industry and agriculture. For each of these school types there are entrance examinations.

The Ecole complémentaire of three years gives basic instruction to children intending to remain at school only until the minimum leaving age of 15 years. These are mostly children with learning difficulties.

In the period of data collection for SIMS the Ecole moyenne and the Secondary Professional Schools were gradually being replaced by a new school type called Lycée secondaire technique. In the Study both the Ecole moyenne and the Ecole professionelle and the new school type, Lycée secondaire technique, with different mathematics programs were included.

II. Teacher Qualifications

The preparation of Lycée teachers consists of a university degree in mathematics (after a least four years of study of mathematics) followed by professional teacher training of three years. Those who have completed their studies, except for teacher training, are termed stagiaires. Because of a teacher shortage, mathematics may be taught in the lower classes by teachers who have specialized in other scientific disciplines.

To teach in the Lycée secondaire technique teachers require a university degree and some professional training (not necessarily in mathematics in either case), although some may be stagiaires.

III. Mathematical Content/Materials

Each school type has a mathematics syllabus prescribed by the Ministry of Education and subject to periodic modification. In the Lycées, an orientation towards current French programs has been introduced, while in the Moyen adaptation is in the direction of Belgian programs. In the professional schools, both Belgian and German programs are offered. In the Ecole Complémentaire, no modifications have been introduced since 1960.

IV. Examinations and Control

The programs prescribed by the Ministry of Education are compulsory in Luxembourg schools. The entrance examination for the Lycée (grade 7) is identical for all students as is the entrance examination for Lycée secondaire technique (formerly Ecole moyenne and Ecole professionelle). There is no entrance examination to the Ecole Complémentaire.

Teachers are not at liberty to choose or delete topics from the syllabus, particularly in grade 13 in the Lycées, where the final examinations are common for all students. Examination scores are the only results taken into account in that year. In the other years, the teacher is free to decide, within a given program, what is more or less important (in view of the final examination). The School Director, however, is required to verify that the official program has been covered. For this reason, common final tests are often taken by all students of the same grade in any one school.

In the Ecole Complémentaire, teachers are free to select what seems most adequate for the level and interest of the students. There are no national examinations for these schools, which largely contain those who fail the entrance examinations to the other schools.

1.13 NETHERLANDS

I. School System

Compulsory school attendance in the Netherlands begins at age 6½ years and continues to age 16. Primary schools cater for children from age 6 to age 12.

Beginning at the secondary level, students may attend either vocational schools or general secondary schools. Both types of secondary schools begin with one or two transition years to allow for the correction and the prevention of mistaken choices of study and redirection. There is no strict correspondence between age and year in school due to differences in entrance age and the repetition of grades.

Vocational schools occur at three levels: (a) elementary vocational schools (LBO, 4 years) lead to apprenticeships and employment or to advanced vocational education; (2) intermediate vocational schools (MBO, 2-4 years) lead to lower supervisory positions, self-employment, or further training; (3) higher vocational schools (HBO, 2-5 years) lead to managerial or executive positions.

General secondary schools are of three kinds: (1) intermediate general secondary schools (MAVO, 4 years) provide a general education in preparation for MBO or higher general secondary; (2) higher general secondary schools (HAVO, 5 years) provide general education in preparation for HBO or pre-university; (3) pre-university schools (VWO, 6 years) provide a general education in preparation for university study.

By age 16, the end of compulsory education, about 65 percent of the students are completing or continuing in general secondary education and about 45 percent are in lower technical education. Nearly 50 percent of the cohort are still taking some form of education at age 18. Approximately 12 percent of them eventually go on to university study and another 12 percent go to vocational colleges.

II. Teacher Qualifications (Secondary Education)

Teacher training in the Netherlands can take place in universities or in special schools and various levels of qualification are offered. The lowest qualification permits teaching in LBO and MAVO. Further

qualifications are needed to teach in HAVO, and the highest qualification is necessary for teaching in the upper HAVO grades and in VWO.

III. Mathematical Content/Materials

Mathematics syllabuses in the Netherlands have been totally revised since the Secondary Education Act of 1968. Each school-type in secondary general education has its own mathematics syllabus prescribed by the Ministry of Education, and global topic areas are specified to be taught at particular grade levels for each type. The courses offered vary in both content and complexity.

Students in pre-university education (VWO) study a number of compulsory subjects, including mathematics, through the first three years. For the last three years, most VWO programs allow students to choose between two emphases: (A) Foreign languages and economics subjects; (B) Science and Mathematics. The students choosing the A-Program may, if they wish, select Mathematics I (Algebra and Calculus). Students choosing the B-Program must select Mathematics I, but Mathematics II (Vector Geometry and Linear Algebra) is optional.

For elementary vocational schools (LBO) there is no prescribed mathematics syllabus, and so these schools have much more freedom in determining the content of their mathematics programs. The only official syllabus constraint in the vocational education system is a prescribed program for students taking the final examination at the highest level of LBO.

IV. Examinations and Control

Students take a national examination at the final grade level in each type of secondary school. Those in general secondary education take a written examination, prescribed by the Ministry of Education, in each school subject. Two years before final examinations, HAVO and VWO students select their examination subjects; HAVO students are required to choose six subjects, VWO students choose seven subjects, and MAVO students choose six subjects.

In vocational education (LBO), students may take examinations at one of three levels (A, B, C). Only those for level C (the highest) are

determined by the Ministry of Education. Individual schools are completely free to determine their programs and methods of assessment at the two lower levels.

1.14 NEW ZEALAND

I. School System

Attendance is compulsory from 6 to 15 years of age, although most children begin at 5 and about 70 percent of the children remain in school until 16 years of age. Nearly 30 percent complete 5 years of secondary school but only 17 percent complete the terminal year of secondary school.

State primary and intermediate schools are comprehensive schools offering courses for all levels of ability. Private schools are established to provide education within the framework of a particular or general religious or philosophical belief. They are not controlled by a statutory authority. Integrated schools are private schools, mainly Roman Catholic, which have become part of the state system under the control of a statutory authority.

A majority of students attend state secondary schools, most of which are coeducational, non-selective schools. In some cities zones are established and school selection is restricted according to the area in which the children live. Approximately 30 percent of all students at the secondary level attend schools segregated by sex.

II. Teacher Qualifications

The typical secondary school mathematics teacher completes a 3 or 4 year degree at a university followed by one year of teacher training in a secondary teachers college. The typical primary/intermediate teacher spends 3 years at a primary teachers college and is generally not a mathematics specialist.

III. Mathematical Content/Materials

New Zealand has a national syllabus in mathematics. Since 1970, a new syllabus based on "modern mathematics" and the spiral approach has been in place. In general, all Population A (Form 3) students follow a common integrated mathematics syllabus with the degree of difficulty of the course adjusted to class ability. The new syllabus at Population B level (Form 7) reflects an increased emphasis on mathematical structure and the notion of function. At this level, students are generally free to choose from a

variety of subjects. About two-thirds spend 4 to 5 hours per week on mathematics.

At lower levels, textbooks are written to the national syllabus and exert a powerful effect on course objectives and content. At higher levels, teachers are free to choose the sequence and emphasis of content as they think appropriate, but external examination prescriptions exert a strong influence on course objectives and content.

IV. Examinations and Control

National norm-referenced examinations are scheduled for the last three levels of schooling as follows:

Age 15: School Certificate Examination. This can be taken in one to six subjects; most students take at least four, and three-quarters include mathematics as one of their options.

Age 16: University Entrance Examination. Teachers are able to "accredit" students for this qualification, assessing their suitability for university by a process of internal assessment. Of the students enrolled at this level, between 55-60 percent gain university entrance. In addition, all students usually study for the Sixth Form Certificate, which allows a wider range of subjects and is based on internal assessment with standards set nationally.

Age 17: Universities Bursaries Examination. This is taken by most students at this level and also by very able students aged 16. Bursaries are awarded on the basis of total marks obtained in 3, 4, or 5 subjects. The most able students may also take University Scholarship Examinations.

Mathematics examinations and standards are set by the School Certificate Examination Board (government appointed), by regional Mathematical Associations, or by the Universities Entrance Board. Movement through the three examination levels is determined by principals of individual schools but is based on national examination guidelines which outline what constitutes a pass at each level.

1.15 NIGERIA

I. School System

Education in Nigeria has been developing rapidly in recent years, with increasing enrollments at all levels of the system.

The structure of the system is being altered in accordance with a National Policy of Education, introduced in 1976. Formerly, primary school courses--intended to cater for children aged six years or older--were of six or seven years' duration. The various types of secondary education (secondary grammar, modern, technical, commercial, and comprehensive) offered five-year courses, except for modern schools (being phased out), which offered three-year courses. Some secondary grammar schools provided a further two-year pre-university course, leading to advanced certification in three school subjects (e.g., Mathematics, Physics, Chemistry, Biology, Economics, English Language, etc.). All of the secondary schools are now state-owned.

Under the National Policy on Education, changes include the introduction of a uniform six-year cycle for primary education, followed by a uniform two-tier system of secondary education (a three-year junior cycle course, followed by a three-year senior cycle course).

Apart from the restructuring of the secondary education in terms of years, there is also a restructuring of the curriculum. What used to be the different types of secondary schools--grammar, technical, commercial, etc., are reflected in the new structure as curriculum options or streams. In the Junior Secondary Schools all students will be exposed to both "academic" subjects (English language, Mathematics, Social Studies, etc.) and pre-vocational subjects (metal work, woodwork, electronics, local crafts, etc.).

In the Senior Secondary all students will be exposed to a core curriculum plus a set of electives which will have the effect of streaming the students into academic (grammar), technical, commercial, etc.

Full implementation of this new system is not achieved yet because the schools are yet to be equipped for the technical and vocational courses.

Universal primary education is now within sight. At secondary level, however, participation rates are still low.

II. Teacher Qualifications

Various types of teacher qualification are available in Nigeria. The Teachers Grade II Certificate is officially prescribed as the minimum qualification for primary school teachers (though some teachers have no training, and indeed may have no postprimary education). There is a category of Grade I teachers who have specialized in rural science.

Secondary "grammar" school teachers possess the Nigerian Certificate in Education (a three-year course for people who have the West African School Certificate--described below--or an equivalent qualification), or university degrees (for example, the Bachelor in Education or a "subject" degree with or without post degree teaching certificate). N.C.E. teachers teach the lower secondary classes while degree-holders teach in the higher classes of secondary school. Teachers of mathematics may not have a special mathematics degree but would have taken some mathematics courses beyond the secondary school level (either in a College of Education or at the university).

III. Mathematical Content/Materials

Traditional African education used elaborate counting systems which were taught in informal ways. When formal Western-style schooling was introduced, primary school mathematics was limited to arithmetic. Second-level courses dealt with the traditional topics of arithmetic, algebra, geometry, and trigonometry.

At the time of the attainment of nationhood, a case was being made for curriculum reform in all Africa. The African Mathematics Program (AMP), popularly known as Entebbe Mathematics, was the first scheme to come to prominence. Workshops, held between 1962 and 1969, produced more than 80 mathematics texts, spanning primary level, secondary level, and teacher-education. Nigerians were to the forefront in this development. The most successful AMP project in Nigeria was the Lagos experiments for which new primary textbooks were written. Altogether, however, it could not be claimed that the mathematics taught in the average Nigerian school was "modern."

In 1970, the Federal Military Government created the Nigerian Educational Research Council (NERC). This body was responsible, in the early 70s, for workshops aimed at mathematics at primary, secondary and teacher-training

level. A systematic and integrated approach throughout Nigeria was lacking, however. When government intervention eventually came, it took the form of a decree that "modern" mathematics was to be abolished in primary school and suspended at secondary level. A national task force, already set up by NERC, worked on the development of new curricula. In fact, some modern concepts are included, though unacceptable terminology has been avoided; for example, the concept of a set is present in the curriculum, but the term "set" is avoided.

IV. Examinations and Control

There is a national examination at the end of primary schooling; it is conducted by the various state ministries of education, and leads to the First School Leaving Certificate. Entrance to secondary grammar and technical schools is controlled by an Entrance examination. The West African Examinations Council (WAEC) on behalf of the federal government, conducts a national common entrance examination for entry into the federal government-owned secondary schools; while state Ministries of Education conduct state entrance examinations for entry into their own secondary schools. WAEC is a multinational examining body, embracing Gambia, Ghana, Liberia, Nigeria and Sierra Leone; in each country, it conducts those examinations decreed by the national government in question. For Nigerian secondary education, it conducts the West African School Certificate examination, the terminal examination for basic secondary education in Anglophone West Africa. This is after five years in the old system and will be after six years when the new system starts operating. WAEC still has about four years to align its syllabus with that of the NERC. WAEC also deals with the Higher School Certificate (taken after a pre-university course lasting a further two years) and other such examinations. This pre-university course will be phased out under the new system.

1.16 SCOTLAND

I. School System

The general supervision of the education system in Scotland, except for the universities, is the responsibility of the Secretary of State for Scotland acting through the Scottish Education Department. The duty of providing education locally rests with twelve local authorities, which are responsible for buildings, equipment, and employment of staff. There are three main types of schools: education authority (under the management of local authorities, and accounting for the vast majority of the schools), grant-aided schools (accounting for 2% of the students), and independent schools (holding less than 2% of the students).

Full-time primary schooling is from five to twelve. Pupils then generally go on to six-year comprehensive schools which are typically co-educational and non-denominational although there is a statutory requirement for local authorities to provide schools for particular denominations where numbers justify it. Schooling is compulsory to age 16 but approximately 50% continue beyond this age.

II. Teacher Qualifications

All teachers must be registered with the General Teaching Council for Scotland.

Primary teachers train at colleges of education, either for three years or (in conjunction with a university or the Council for National Academic Awards) for a four year B.Ed. course; or alternatively they pursue a one-year course at a college of education after their university degree.

Secondary teachers must be graduates. Apart from a small number who follow a concurrent course, all graduates take a one-year teacher-training course at a college of education.

III. Mathematical Content/Materials

Curriculum is generally in the hands of the local authorities and schools have considerable freedom for experimentation. There is a Central Consultative Committee on Curriculum, which is the main advisory body to the Secretary of State for Scotland. There are also four Curriculum Development

Centres, attached to colleges of education; together with Her Majesty's Inspectors of Schools, they provide curricular guidance to local authorities and teachers.

The Scottish Examination Board (formerly the Scottish Certificate of Education Examination Board) lays down very broad outlines, without detail, of the curricula to be followed by students sitting for their examinations (about half the age cohort in the case of mathematics). Expert groups--for mathematics, the Scottish Mathematics Group (SMG)--then produce materials to flesh out these courses. Use of these is voluntary, but the SMG textbooks are selected and used by more than 90% of teachers.

Materials for a modular mathematics course, intended for mixed ability and less able classes and for students who are not aiming to specialize in mathematics, have also been devised; however, they are not widely used.

IV. Examinations and Control

The Scottish Certificate of Education is taken at Ordinary Grade in fourth year, and Higher Grade in fifth and sixth year.

1.17 SWAZILAND

I. Structure of the Educational System

Since independence, the government has set a goal of eventually providing basic education for the entire population. While the goal had not yet been achieved by the early 1980s, progress was being made. Over the 11 years from 1969 to 1980, the number of primary and secondary schools together had grown by 30 percent, pupils by 90 percent, and teachers by 112 percent. In 1980, over 112,000 pupils attended 450 primary schools and 23,000 students attended 82 secondary schools; a large proportion of the schools were operated by private organizations.

In the early 1980s, the primary course extended from grade 1 through grade 7. Although most children enter school at age six, many who graduate from the primary grades are older than age 12, because of a high incidence of grade reputation.

Secondary education extends from form 1 through form 5. The dropout rate in secondary schools is high, chiefly because of students performing poorly in academic work or lacking the funds to pay school fees.

II. Teacher Qualifications

Two colleges offer two-year training programs for primary-school teachers, with candidates from among holders of junior secondary school certificates. William Pitcher College also offers a two-year course for lower-secondary teachers. Additional secondary-school teachers are graduates of the University of Botswana and Swaziland, which offers a four-year degree program.

The rapid growth of primary education following independence found the nation faced with a critical shortage of qualified teachers so that a large number of untrained people had to be employed to staff primary school classrooms. The government therefore inaugurated an inservice educational system to upgrade the skills of under qualified teachers.

Because there continues to be a shortage of local instructors for secondary schools, Swaziland still recruits expatriates to fill positions for which Swaziland teachers are not prepared or which they have vacated in order to take more attractive employment in other sectors of the job market.

III. Curriculum Development

Curricula are designed by primary and secondary units within the Ministry of Education. At the primary level, the course of study includes such conventional academic subjects as mathematics, science and social studies, English, and Siswati. In the secondary schools the same array of academic subjects are taught as in the primary grades but at a higher level of complexity.

IV. Examination System

The educational system includes three major examinations in the 12-year primary and secondary sequence. The first, given at the end of the primary course, earns the Swaziland Primary Certificate. The second, for the Junior Certificate, is given at the end of form 3. The third, for the Cambridge Certificate, comes at the end of form 5. At each level, as in many countries following the British educational pattern, many students leave the school system because they either fail the examination or else do not qualify for the limited number of openings at the next level. The most serious cause of such dropout is the shortage of facilities at the upper levels.

1.18 SWEDEN

I. School System

Swedish education has been characterized by "rolling reform": the introduction of successive reforms, based on research and duly followed by evaluation, each one leading on to the next. The reforms of the 1960s are particularly notable. Following many years of study and more than a decade of experimentation, the then existing "parallel" systems of schools of different types was replaced from 1962 by a nine-year compulsory comprehensive school (grundskola) catering for students of from 7 to 16 years of age. Compulsory schooling starts at age 7, and spans the nine years of the grundskola. The grundskola has three departments: lower (grades 1 to 3), middle (grades 4 to 6), and upper (grades 7 to 9). From grade 7 students can choose between short (easier) or long (harder) course alternatives in mathematics and English. But the main principle is that until the end of their compulsory schooling, students are kept together in undifferentiated classes, and that regardless of their choice of electives and course types in the compulsory school, they can choose either theoretical or practical study lines in their subsequent non-compulsory schooling.

More recently, upper secondary schooling has also been unified, and students may take two, three or occasionally four years of post-compulsory education in the gymnasieskola. At present, some 85 percent of the cohort proceed to the gymnasieskola, entering one of 23 "study lines" (Natural Sciences, Liberal Arts, Technology, and so forth). After upper secondary school students can go on to higher education. Every study line in the gymnasieskola (in some cases after supplementary studies in special subjects) fulfills the general admission requirement for higher education. Within the last few years, higher education too has been unified. These major reforms were centrally organized and administered; but recently, the strongly centralized system is giving way to different patterns of decentralization.

II. Teacher Qualifications

Teachers in the lower and middle departments of the grundskola are trained at teachers' colleges (Schools of Education); those in the lower department prepare for two and a half years, while those in the middle department prepare for three years. Teachers in the upper department of the grundskola, and in the gymnasieskola, do at least three years of university study (normally obtaining a B.A. or a higher degree), and then take a year's pedagogical and practical training at a School of Education.

Even at senior levels, teachers of mathematics generally teach one or two other subjects as well.

III. Mathematical Content/Materials

The National Board of Education (NBE) compiles and reviews the curriculum, recommends working methods, and is responsible for research and development in the schools.

Curricula for the grundskola were specified in the program Lgr62 and again in Lgr69 and Lgr80 (the numbers referring to the years of issue); those for the gymnasieskola were set out in Lgy65 and again in Lgy70.

In mathematics, the 1960s saw the introduction of typical "modern" content into the curriculum. After the Royaumont conference in 1959, the Nordic Committee for Modernizing the Teaching of Mathematics was set up; it worked between 1960 and 1967, carrying out extensive experiments with new teacher materials at the level of both the grundskola and the gymnasieskola. Also, in 1964, the NBE appointed a working party on new terminology in mathematics. Both these developments affected the mathematics in Lgr69. This was not as radically different from Lgr62 as had been expected and hoped for; but it did introduced typical "modern" work, for example in inequalities, sets, and probability and statistics. At the level of the gymnasieskola, Lgy65 introduced a more radical program, including vectors (in place of the former Euclidean geometry), calculus, differential equations, complex numbers and set theory. This program was reduced in the syllabus of 1972 representing a partial withdrawal from "modern mathematics." Courses for both types of school have been further revised more recently omitting some of the "modern mathematics."

IV. Examinations and Control

There are no final examinations of traditional type.

The curricula published in 1962, 1969 and 1980 have resulted in a major reduction in the use of marks at primary levels. Final marks are crucial to students who have chosen a study line at upper secondary school where the number of places is smaller than the number of applicants and a selection is therefore necessary. There is a five-point scale of marks, on which 1 is lowest and 5 is highest, on a relative basis for the country as a whole. To help arrive at norms for assigning marks, nationally standardized tests are given in Swedish, foreign languages and mathematics in a comprehensive school. At the upper secondary level, standardized tests are administered at all schools throughout the country in a number of additional academic subjects. These tests are compulsory only in the upper secondary school.

1.19 THAILAND

I. School System

Since the proclamation of the 1977 National Scheme of Education, schooling in Thailand has been divided into primary education, lower secondary education and upper secondary education. A majority of students attend public schools, and attendance is compulsory until age 15 or completion of primary education, whichever comes first. Primary education covers the first six years of schooling, and lower and upper secondary education each require three years for completion. At the lower secondary level students are able to choose from a wide variety of academic and vocational studies in accordance with their interests and aptitudes. The upper secondary level allows specialization in those areas necessary to the students' future, continued studies or vocational careers.

The percentage of the relevant age group enrolled in schools for the primary, lower secondary and upper secondary level are 97, 29 and 17 respectively. Public primary schools account for 91 percent of the school population aged from 7 to 13. At the lower secondary level, public schools account for 79 percent of the school population (age-range 14 to 16). At the upper secondary level (age-range 17 to 19) there are 3 types of school: academic, vocational and teacher training. Here, public schools account for 28 percent of the academic-stream student population, 48 percent of the vocational-stream, and all of the teacher training-stream.

II. Teacher Qualifications

The typical teacher of Population A students completes a two-year diploma in education at a teacher training college, taking mathematics as a major field of study. Training starts after the completion of secondary education or following a diploma in education (primary level). Opportunities are available for these teachers to continue their study at a university for two more years to earn bachelor's degrees in education, concentrating on mathematics.

The typical teacher of Population B students has completed a four-year bachelor's degree in education with a major field of study in mathematics.

III. Mathematics Content/Materials

Thailand has national curricula for all school subjects. The Ministry of Education is responsible for their development and implementation. A new integrated syllabus based on "modern mathematics" was introduced in 1977 for the upper secondary level and in 1978 for the lower secondary and primary levels.

All Population A students follow a common mathematics syllabus which stresses the mathematics essential for everyday life. In the last year of the lower secondary level and at the upper secondary level, mathematics is not compulsory, but the majority of the students follow one of the two available programs: one for "mathematics/science" students which reflects an emphasis on mathematical structure, and another for "arts" students which includes fewer topics and puts less emphasis on structure. The two programs require approximately six and four hours per week, respectively.

At all levels, textbooks are written to the national syllabus and published by both the Ministry of Education and private publishers. Methods of presentation used by teachers follow closely those given in textbooks and teachers' manuals.

IV. Examinations and Control

Each school sets its own examination papers for each grade, following closely the national curriculum and the evaluation guidelines prescribed by the Ministry of Education. In some regions, schools form into groups to assist each other in various academic matters, including the sharing of examination papers. Standardized tests are being prepared by the Ministry of Education for national assessment purposes. Schools normally require entrance examinations at the lower secondary and upper secondary levels.

1.20 UNITED STATES OF AMERICA

I. School System

The school system of the United States exemplifies decentralization. Not only are the 50 states responsible for policy and practice, they variously delegate responsibilities to school districts within their boundaries. The tradition of local control remains a significant force in the U.S. As a general rule, schooling is compulsory from about 6-16 years and provided tuition-free until the age of 18 (in some areas to about 20). About 10 percent of students attend private schools, the majority of which are associated with religious denominations.

The predominant pattern is seven years of elementary schooling (K-6), followed by three years each of junior and senior high school. In some cases, the two high school levels are contained within one institution. In others, elementary school extends to eight years, followed by a 4-year high school. An emergent pattern is a 4-year primary school, succeeded by four years in each successive level: middle (or intermediate) school, and high school.

II. Teacher Qualifications

Teachers are prepared for the elementary and secondary schools in undergraduate institutions, some of which were formerly teachers colleges. Students intending to teach at the secondary level follow a general four year course of studies leading to a bachelor's degree, with a concentration in the academic subject they plan to teach and professional studies. Some teachers complete the undergraduate academic program before studying professional subjects at the graduate level. All will have some supervised student teaching experience as part of their professional preparation. Graduate and in-service studies have also been encouraged by salary incentives and state licensing requirements. Many states demand a master's degree for a permanent secondary school teaching certificate.

III. Mathematical Content/Materials

For roughly the first eight school years (grade K-7, ages 5-12), all students study a general mathematics curriculum, with emphasis on arithmetic

of whole numbers, fractions, and measurement. In many schools, students are grouped by ability and move at a faster or slower pace through the core topics.

Beginning in grade 8 (13 years old), the first clear content/student streaming appears on a significant scale. Approximately 10 percent of all eighth-graders take a full-year course in elementary algebra (polynomials through quadratics). These are the students most likely to enter university study in a mathematically-oriented discipline. Their usual progression of courses is:

Grade 8	(age 13)	Algebra I
Grade 9	(age 14)	Geometry
Grade 10	(age 15)	Algebra II and Trigonometry
Grade 11	(age 16)	Elementary Functions, Analysis or Trigonometry/Analytic Geometry
Grade 12	(age 17)	Calculus

The most common variation is interchange of Geometry and Algebra II. By grade 12 this group has shrunk to about 5 percent of the student cohort.

While ability grouping among the remaining mathematics students is common in grade 7 or 8, the next point of curricular streaming is at grade 9 (age 14). At that point most students who will pursue college preparatory programs begin algebra, while the others continue general mathematics (largely pursuing a previously elusive mastery of basic arithmetic skills). The second level of college-bound students includes many who will eventually pursue a mathematically-oriented career such as engineering, mathematics teaching or computer science. Those students will follow the above course sequence, one year behind. Another group of college-bound students will pursue only two or three years of this sequence--often with much less depth or breadth in the individual courses.

IV. Examinations and Control

The only nation-wide examinations for secondary school students are offered by private, non-profit organizations, which determine content and standards of achievement in consultation with teachers, subject specialists at universities, and state and local school administrators. Results are taken into account by colleges in their admission procedures. New York

State provides the state-wide Regents' Examinations in high school subjects, but students may acquire high school diplomas signifying completion of the required number of courses as certified by high school authorities, which may be sufficient to allow them to enter 2- and 4-year colleges.

Generally, standards and examinations for completion of course requirements and for graduation from secondary school are set by the school or the school district.

2. Cognitive Item Tables

2.1 POPULATION A

2.1.1 Key to Reading Cognitive Item Table

For each item the following information is available in the cognitive item table:

Sample Item:

Line 1: 009 30 is 75% of what number?
Line 2: 1 004 1 0 0 33 0 36 0 1 06 07 14 15

Line 1: International information

009--Item code

30 is 75% of what number?--Partial text

Line 2: International information

1--Correct response (key)

004--Position in international content grid

1--Behavioural level

0--Anchor item status

0 33--Form and position of the item on the cross-sectional version of the study (e.g., Core form-Item 33)

0 36--Form and position of the item on the longitudinal version of the study (e.g., Core form-Item 36)

0--Stratum for crossectional form construction

1--Stratum for longitudinal form construction

06 07 14 15--Subtest codes

Definitions:

International content grid

000 Arithmetic
- 001 Natural Numbers
- 002 Common Fractions
- 003 Decimal Fractions
- 004 Ratio, Proportion, Percent
- 005 Number Theory
- 006 Exponents
- 008 Square Roots
- 009 Dimensional Analysis

100 Algebra
- 101 Integers
- 102 Rationals
- 103 Integer Exponents
- 104 Formulas
- 105 Polynomials
- 106 Equations and Inequations
- 107 Relations and Functions
- 110 Finite Sets

200 Geometry
- 201 Classification of Plane Figures
- 202 Properties of Plane Figures
- 203 Congruence of Plane Figures
- 204 Similarity of Plane Figures
- 205 Geometric Construction
- 206 Pythagorean Triangles
- 207 Coordinates
- 208 Simple Deduction
- 209 Informaal Transformation
- 212 Spatial Visualization
- 215 Transformational Geometry

300 Statistics
- 301 Data Collection
- 302 Organization of Data
- 303 Representation of Data
- 304 Interpretation of Data
- 306 Outcomes/Events

400 Measurement
- 401 Standard Units
- 402 Estimation
- 403 Approximation
- 404 Area, Volume, Etc.

Behavioural level

- 1 Computation
- 2 Comprehension
- 3 Application
- 4 Analysis

Anchor item status (An item that appeared in the First International Mathematics Study is an anchor item.)

- 0 Not an anchor
- 1 Anchor item
- 2 Modified anchor item

Stratum for cross-sectional form construction

1 Arithmetic
2 Algebra
3 Geometry
4 Statistics
5 Measurement

Stratum for longitudinal form construction

1 Fractions
2 Ratio, Proportion, Percent
3 Algebra
4 Geometry
5 Measurement
6 Integers (not in international core)
7 Statistics (not in international core)

Subtest codes

These are the subtests as defined in the study. The number of subtest codes per item varies. The following subtest codes are used:

01 Estimation and Approximation
02 'New maths' in First Study
03 Basic skills
04 Algebra (Computation)
05 Calculator use
06 Arithmetic (Computation)
07 Proportionate thinking
08 Anchor Items
09 Whole numbers
10 Common fractions
11 Common fractions (Computation)
12 Decimal fractions

2.1.2 Cognitive Item Table

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001 (22 * 18) - (47 + 59) is equal to
1 001 1 1 0 20 2 34 0 1 6 03 05 06 08 09 15 45

002 Matchsticks are arranged as follows. If the pattern is
2 001 3 0 0 31 4 12 0 1 6 09 15 16

003 2/5 + 3/8 is equal to
5 002 1 1 0 17 0 31 1 1 1 03 06 08 10 11 15 43 45

004 Which of the following is a pair of equivalent fractions?
4 002 2 0 0 14 3 3 0 1 1 10 15 16

005 0.40 * 6.38 is equal to
3 003 1 1 0 18 0 26 0 1 1 03 05 06 08 12 15 43 45

006 Alexandra walked from Riverview to Bridgeport, which are
3 003 3 0 0 3 2 7 0 1 1 03 12 15 16 44 48

007 (847.36) in the number in the box, the digit 6 represents
1 003 2 0 0 35 4 33 0 1 1 03 12 15 16

008 In a school of 800 pupils, 300 are boys. The ratio of the
5 004 2 0 0 26 0 33 1 1 2 07 13 15 16

009 30 is 75% of what number?
1 004 1 0 0 33 0 36 0 1 2 06 07 14 15

010 The value of 2**3 * 3**2 is
4 006 1 1 0 23 2 16 0 1 2 03 05 06 08 15 45

011 What is the square root of 12 * 75?
2 008 2 1 0 34 1 30 0 1 2 05 08

012 (-2) * (-3) is equal to
5 101 1 0 0 4 0 16 1 2 3 04 17 20

013 The air temperature at the foot of a mountain is 31 degrees.
5 101 3 0 0 40 0 25 1 2 3 03 17 20 21 44

014 Which of the following sequences of numbers is in the order
3 102 2 0 0 1 1 35 0 2 3 20 21

015 Simplify: 5x + 3y + 2x - 4y
4 104 1 1 0 10 2 24 0 2 3 04 08 18 20 43 45

016 Soda costs a cents for each bottle, but there is a refund
2 104 3 1 0 25 4 27 0 2 3 08 18 20 21 46

017 If p = lw and if p = 12 and l = 3, then w is equal to
3 106 1 1 0 12 0 13 0 2 3 04 08 19 20 43 45

018 The error in the above reasoning, if one exists, first
1 106 4 0 0 22 2 12 0 2 3 19 20 21

019 The table below compares the height from which a ball is
3 107 2 0 0 39 0 30 0 2 3 20 21

020 There are 9 elements in set q and 6 in set r. How many
4 110 3 0 0 16 0 0 0 2 3 20 21

021 A quadrilateral must be a parallelogram if it has
5 201 2 0 0 28 3 23 0 3 4 22 26 29 31

022 AB, CD, AD, EF are intersecting straight lines as shown
1 201 1 0 0 9 1 27 0 3 4 23 26 29 30

023 The length of the circumference of the circle with center at
4 202 4 1 0 32 0 19 1 3 4 07 08 23 26 29 31 46

024 If segment PQ were drawn for each figure shown below, it
4 203 3 0 0 36 3 29 0 3 4 24 26 29 31

025 The triangles shown above are congruent. The measures of
2 203 3 0 0 6 1 6 0 3 4 24 26 29 31

026 On level ground, a boy 5 units tall casts a shadow 3 units
2 204 3 1 0 19 4 15 0 3 4 07 08 25 26 29 31 46 48

027 (Right triangle with 2 sides given) What is the value of S?
2 206 1 0 0 2 3 1 0 3 4 29 30

028 What are the coordinates of point P?
4 207 1 0 0 38 0 39 1 3 4 27 29 30

029 One of the following points can be joined to the point (-3,4)
1 207 3 0 0 29 1 34 0 3 4 27 29 31 48

030 In which diagram below is the second figure the image of the
3 209 1 0 0 5 1 2 0 3 4 28 29 30

031 The diagram shows a cardboard cube which has been cut along
4 212 3 0 0 13 0 7 0 3 4 29 31

032 Here is a table that shows the number of trees planted along
5 302 2 0 0 7 4 34 0 4 7 03 34 35

033 The circle graph shows the proportion of various grain crops
1 303 2 0 0 21 1 22 0 4 7 03 32 34 35

034 Which of these is a true statement about the information
3 303 3 0 0 15 4 21 0 4 7 03 32 34 35

035 The arithmetic mean (average) of: 1.50, 2.40, 3.75 is equal
2 304 1 1 0 27 3 30 0 4 7 05 06 08 34 41 43 45

036 Which of the following is ... to the weight of a normal man?
2 401 1 0 0 30 3 2 0 5 5 01 03 36 38 39

037 The total area of the two triangles is
1 404 3 0 0 24 2 28 0 5 5 37 38 40

038 On the above scale the reading indicated by the arrow is
5 402 3 1 0 37 0 9 0 5 5 01 03 08 38 40

039 What is the volume of a rectangular box with interior
5 404 1 0 0 11 4 2 0 5 5 03 37 38 39 43

040 There is a brass plate of the shape and dimensions shown in
2 404 3 1 0 8 3 31 0 5 5 08 37 38 40

041 1054 - 865
1 001 1 0 1 27 4 13 0 1 6 03 05 06 09 15 43

042 Which of the following is equal to a quarter of a million?
4 001 1 2 1 33 1 1 0 1 6 03 05 06 08 09 15

043 Which of the points a, b, c, d, e on this number line
5 002 2 0 1 11 0 37 1 1 1 10 15 16

044 There are 35 students in a class. 1/5 of them come to school
2 002 3 0 1 10 2 35 0 1 1 03 10 15 16 44

045 The value of 0.2131 * 0.02958 is approximately
3 003 2 1 1 21 0 15 0 1 1 01 05 08 12 15 16 45

046 20% of 125 is equal to
4 004 1 0 1 16 0 38 1 1 2 03 05 06 14 15

047 If the ratio of 2 to 5 equals the ratio of n to 100, then n
3 004 2 2 1 20 3 18 0 1 2 07 13 15 16 42 43

048 If 10**2 * 10**3 = 10**n then n is equal to
2 006 1 0 1 17 1 24 0 1 2 06 15

049 -5(6 - 4) is equal to
4 101 1 0 1 22 4 31 0 2 3 04 17 20

050 John is 4 years older than Ellen and Ellen is 11 years
2 101 3 0 1 3 0 0 0 2 3 17 20 21

051 A student's solution to the problem....check the student's
5 102 4 0 1 15 0 0 0 2 3 20 21

052 The cost of printing greeting cards consists of a fixed
1 104 3 0 1 1 3 12 0 2 3 20 21

053 When x = 2, (7x + 4) / (5x - 4) is equal to
2 105 1 0 1 29 1 28 0 2 3 04 20

054 Which equation is true for all values of n?
1 106 2 0 1 32 4 20 0 2 3 19 20 21

055 For the table shown, a formula that could relate m and n is
5 107 3 0 1 2 2 5 0 2 3 20 21

056 Which one of the following diagrams illustrates the statement
3 110 1 0 1 28 0 0 0 2 3 04 20

057 The figure QRST is a square and PQT an equilateral triangle.
4 201 3 0 1 9 1 31 0 3 4 22 26 29 31

058 Lines AB and CD are parallel. Two angles whose measures
2 202 2 0 1 13 1 10 0 3 4 23 26 29 31

059 Three straight lines intersect as shown in the diagram.
4 202 4 1 1 34 2 8 0 3 4 08 23 26 29 31

060 Two of these triangles are similar. They are
5 204 1 0 1 26 0 0 0 3 4 25 26 29 30

061 If s is the set of points with x-coordinates greater than 3
1 207 2 0 1 30 0 0 0 3 4 27 29 31

062 In the above rectangle the measure of angles ROQ is
3 208 3 0 1 4 2 13 0 3 4 29 31

063 PQRS is a rectangle. Its image after a transformation is
1 209 1 0 1 18 4 29 0 3 4 28 29 30

064 What is the name of the solid figure, each of whose faces
1 211 1 0 1 14 0 0 0 3 4 29 30

065 You wish to know about the popularity of the soft-drink Slosh
5 301 2 0 1 19 3 7 0 4 7 34 35

066 The graph shows the distance traveled by a tractor during a
2 303 2 0 1 24 1 19 0 4 7 32 34 35

067 Joe had three test scores of 78, 76 and 74, while Mary had
3 304 2 1 1 7 2 9 0 4 7 08 34 35 44 46

068 The distance between two towns is usually measured in
5 401 1 0 1 31 0 29 0 5 5 03 36 38 39

069 The length of AB is 1 unit. Which is the best estimate for
2 402 2 0 1 12 0 8 1 5 5 01 38 40

070 What is the area of the above parallelogram?
4 404 1 0 1 25 1 20 0 5 5 37 38 39

071 The rectangle shown above is cut along the dotted lines, and
3 404 2 0 1 23 2 18 0 5 5 37 38 40

072 The figure above shows a rectangular box. Which of the
4 403 3 0 1 5 1 9 0 5 5 01 03 05 38 40

073 162 * 45 is equal to
5 001 1 0 2 9 3 28 0 1 6 03 05 06 09 15 43

074 (Triangular array of 1's) What is the sum of the 50th row?
1 001 4 0 2 8 1 17 0 1 6 09 15 16

075 In the figure the little squares are all the same size and
3 002 2 1 2 26 0 28 1 1 1 03 07 08 10 15 16

076 Four 1-liter bowls of ice cream were set out at a party.
5 002 3 0 2 27 0 4 0 1 1 10 15 16 44

077 The position on the scale indicated by the arrow is
2 003 2 0 2 23 1 18 0 1 1 01 03 12 15 16

078 A runner ran 3,000 meters in exactly 8 minutes. What was
2 003 3 1 2 12 4 3 0 1 1 05 08 12 15 16 46

079 A painter is to mix green and yellow paint in the ratio of
4 004 3 0 2 24 0 12 1 1 2 07 13 15 16 44

080 Which of these numbers is a prime number?
3 005 1 0 2 11 2 20 0 1 2 06 15

081 Since 4 * 9 = 36, the square root of 36 is equal to
4 008 2 0 2 22 3 33 0 1 2

082 The set of integers less than 5 is represented on one of the
1 101 2 0 2 34 4 5 0 2 3 17 20 21

083 A, B, and C are numbers greater than 0. Which of these is
5 102 2 0 2 13 0 0 0 2 3 20 21

084 0.00046 is equal to
2 103 1 0 2 29 1 33 0 2 3

085 If y dollars are shared equally among four boys, how many
4 104 2 0 2 4 2 29 0 2 3 18 20 21 44

086 If 4x/12 = 0, then x is equal to
1 106 1 1 2 1 0 18 1 2 3 04 08 19 20 45

087 The Davis family took a car trip from Anabru through Bergen
3 106 3 0 2 28 1 4 0 2 3 19 20 21 44 47

088 a/15 - b/5 is equal to
1 105 1 0 2 5 3 35 0 2 3 20

089 AB // DC and AD // BC. Quadrilateral ABCD is a
2 201 2 0 2 16 2 21 0 3 4 22 26 29 31

090 The line m is a line of symmetry for figure ABCDE. The
3 202 1 0 2 15 2 6 0 3 4 23 26 28 29 30

091 One of the following figures is congruent with the figure
5 203 1 0 2 25 4 16 0 3 4 24 26 29 30

092 If triangle XYZ is a triangle similar to triangle ABC but
3 204 3 0 2 32 0 0 0 3 4 25 26 29 31

093 Which of these is a correct statement for this triangle?
1 206 1 0 2 3 2 25 0 3 4 29 30

094 In the diagram, OPQR is a parallelogram, O is the origin,
1 207 3 0 2 33 0 0 0 3 4 27 29 31

095 Which statement can be used to find the value of Y?
4 208 2 0 2 6 0 0 0 3 4 29 31

096 Triangle ABC and triangle A'B'C' are congruent and their
5 209 2 0 2 14 2 14 0 3 4 28 29 31

097 A table shows scores for a class on a 10-point test. How many
2 302 1 0 2 18 1 12 0 4 7 34 41

098 Here is a table of data and a graph of the same data. What is
4 303 2 0 2 31 4 8 0 4 7 32 34 35

099 In the graph, rainfall in centimeters is plotted for 13 weeks
2 304 4 1 2 19 3 27 0 4 7 08 34 35

100 2 meters + 3 millimeters is equal to
2 401 1 0 2 2 0 1 0 5 5 03 36 38 39

101 A 15 centimeter piece is cut from a ribbon 1 meter long. What
1 401 3 0 2 17 1 7 0 5 5 03 36 38 40

102 The measure of the angle shown is nearest to
4 402 2 0 2 30 2 17 0 5 5 01 38 40

103 A square is removed from the rectangle as shown. What is the
3 404 3 0 2 21 0 23 0 5 5 03 05 37 38 40

104 Michael has a large number of wooden blocks. Which are cubical
5 404 3 0 2 7 3 17 0 5 5 03 37 38 40 44

105 Which of the following is (are) true?
5 001 2 1 3 9 4 6 0 1 6 02 05 08 09 15 16

106 Peter and Paul decided to start saving money. Peter can save
4 001 3 1 3 31 1 32 0 1 6 03 07 08 09 15 16 44 46

```
107 1 2/5 - 1/2 is equal to
     2 002 1 0 3 16 3  5 0 1 1 03 06 10 11 15

108 .004)24.56 In the division above, the correct answer is
     5 003 1 1 3  4 1 21 0 1 1 03 05 06 08 12 15 43 45

109 In a discus-throwing competition, the winning throw was 61.60
     2 003 3 0 3 12 0 20 0 1 1 03 05 12 15 16 44

110 In a school election with three candidates, Joe received 120
     3 004 3 0 3 20 4 14 0 1 2 07 14 15 16 44

111 Which of the following equals 7 * (3 + 9)?
     1 005 2 1 3 33 4 28 0 1 2 08 15 16 45

112 3.23 * 10**6 is equal to
     4 006 1 0 3 22 3 21 0 1 2 06 15

113 (-6) - (-8) is equal to
     2 101 1 2 3 23 2 30 0 2 3 04 05 17 20 42 43 81 2 30 527 515 515 0

114 The first error, if any, in this reasoning occurs in
     3 101 4 0 3  1 0  0 0 2 3 17 20 21 81 0 00 000 000 000 0

115 If x = -3, the vaue of -3x is
     5 104 1 1 3 32 1 26 0 2 3 04 08 18 20 43 45

116 If x = y = z = 1, then (x - z) / (x + y) is equal to
     3 104 1 1 3 15 3 16 0 2 3 04 08 18 20 45

117 Six times a certain number (call it q) equals the sum of
     4 106 2 0 3 28 3 13 0 2 3 19 20 21

118 (x/2)  7 is equivalent to
     3 106 1 1 3 34 4 26 0 2 3 02 04 08 19 20 43 45

119 If y = 2x - 5 and x = 2, then y =
     4 107 1 0 3 17 0  0 0 2 3 04 20

120 The symbol P intersect Q represents the intersection of sets
     2 110 2 1 3 21 4 17 0 2 3 02 08 20 21

121 Which of the indicated angles is acute?
     1 201 1 0 3 18 0 17 1 3 4 22 26 29 30

122 (Triangle with 2 angles given) X is equal to
     5 202 2 0 3 30 0 22 0 3 4 23 26 29 31

123 In a quadrilateral, two of the angles each have measure of
     1 202 3 0 3 27 4 24 0 3 4 23 26 29 31

124 If the triangles above are congruent and m angle a =
     1 203 2 0 3 26 0  0 0 3 4 24 26 29 31
```

125 If two triangles are similar, which of the following
1 204 2 0 3 7 3 9 0 3 4 25 26 29 31

126 The straight line joining the points (2,3) and (2,7) cuts
5 207 2 0 3 13 4 4 0 3 4 27 29 31 47

127 In the above diagram, triangles ABC and DEF are congruent,
4 208 3 0 3 25 0 21 1 3 4 28 29 31

128 If, in the given figure, PQ and RS are intersecting straight
3 202 3 1 3 19 3 34 0 3 4 08 23 26 29 31

129 There are 7,000,000 girls under the age of 21 in a country
4 303 3 0 3 10 2 4 0 4 7 32 34 35

130 The weight gain from 6 to 10 months was
2 304 1 0 3 2 4 35 0 4 7 03 34 41

131 The petals on 100 flowers of different kinds were carefully
4 302 2 0 3 14 2 3 0 4 7 34 35

132 A team scores an average of 3 points per game over 5 games.
5 304 1 0 3 8 1 11 0 4 7 07 34 41

133 How many pieces of pipe each 20 meters long would be required
2 401 3 0 3 5 4 23 0 5 5 03 05 36 38 40

134 Each of the small squares in the figure is 1 square unit.
3 402 3 0 3 29 4 7 0 5 5 01 38 40

135 The length of a box was measured and found to be 9 cm to the
5 403 2 0 3 11 2 31 0 5 5 01 38 40

136 What is the capacity of a cubic container 10 cm by 10 cm by
1 404 2 0 3 6 3 15 0 5 5 03 37 38 40

137 Which of the following operations with whole numbers will
4 001 2 1 4 22 2 15 0 1 6 02 05 08 09 15 16

138 A group of children was divided into 7 teams with nine in
3 001 3 2 4 14 3 8 0 1 6 03 09 15 16 42 44

139 (3/5)/(2/7) is equal to
1 002 1 0 4 15 2 10 0 1 1 03 06 10 11 15

140 7 3/20 is equal to
2 003 1 0 4 6 0 32 1 1 1 03 05 06 12 15 43

141 The speed of sound is approximately 340 meters per second.
2 003 3 0 4 3 3 22 0 1 1 05 07 12 15 16 44

142 The table above shows the values of x and y, where x is
5 004 2 0 4 26 1 16 0 1 2 07 13 15 16

143 If there are 300 calories in 100 grams of a certain food,
1 004 3 0 4 7 2 23 0 1 2 03 07 13 15 16

144 One bell rings every 8 minutes, a second bell rings every 12
4 005 4 2 4 16 3 19 0 1 2 15 16 42 44

145 The square root of 75 is between
5 008 2 0 4 13 2 33 0 1 2 05

146 Find the sum: 3 weeks 5 days + 9 weeks 6 days
4 009 1 0 4 5 4 10 0 1 2 03 06 15

147 (- 3/4) - (- 1/8) =
2 102 1 0 4 12 0 0 0 2 3 20

148 Which of the following is false when a, b, and c are
5 104 2 2 4 19 3 24 0 2 3 02 08 18 20 21

149 A shopkeeper has x kg of tea in stock. He sells 15 kg and
3 104 3 1 4 31 0 27 0 2 3 08 18 20 21 44 46

150 12x + 16y =
2 105 1 0 4 10 0 0 0 2 3 04 20

151 If 5x + 4 = 4x - 31, then x is equal to
1 106 1 0 4 30 0 3 1 2 3 04 19 20 43

152 A bowling ball travels 4 meters per second. The distance in
3 107 1 0 4 21 3 26 0 2 3 04 20

153 There are 227 boys in a school. Every boy in the school
5 110 4 2 4 9 0 0 0 2 3 20 21 42

154 Four identical equilateral triangles have been arranged as
2 201 3 0 4 4 0 0 0 3 4 22 26 29 31

155 If AB is a straight line, what is the measure in degrees of
4 202 3 1 4 2 4 19 0 3 4 08 23 26 29 31

156 Triangles PQR and STU are similar. How long is SU?
3 204 3 0 4 29 0 40 0 3 4 07 25 26 29 31

157 If triangle PRS maps onto triangle PR'S under a reflection
5 208 2 0 4 25 0 0 0 3 4 28 29 31

158 Triangle PQT can be rotated (turned) onto triangle SQR. The
2 209 3 0 4 32 3 32 0 3 4 28 29 31

159 The figure above shows a wooden cube with one corner cut off
5 212 2 0 4 1 1 15 0 3 4 29 31

160 Three hours after starting, car A is how many km ahead of car
4 303 2 2 4 33 3 10 0 4 7 08 32 34 35

161 How much longer does it take for car B to go 50 kilometers
1 303 2 2 4 34 2 19 0 4 7 08 32 34 35

162 The graph shows the time of travel by pupils from home to
3 304 2 0 4 23 4 11 0 4 7 03 34 35

163 There are five black buttons and one red button in a jar. If
2 306 1 0 4 11 3 6 0 4 7 34 41

164 According to the scale shown, the length of side BC of a
1 402 1 0 4 8 4 30 0 5 5 01 03 38 39

165 Which of the following is the closest approximation to the area of
4 403 2 0 4 28 0 5 1 5 5 01 03 05 38 40

166 What is the surface area of this solid rectangular box?
5 404 1 0 4 18 3 20 0 5 5 03 37 38 39

167 The area of the shaded figure, to the nearest square unit, is
4 402 3 0 4 20 0 6 1 5 5 01 38 40

168 A solid plastic cube with edges 1 cm long weighs 1 gram.
1 404 4 0 4 17 0 10 1 5 5 37 38 40

169 Suppose you start at point m(-1,-1), move a distance of one
3 207 2 0 1 8 3 11 0 3 4 27 28 29 31

170 Given vector V and vector W as shown in the figure above,
2 215 3 0 4 27 4 18 0 3 4 29 31

171 If D is the direction of projection and A is the axis of
5 215 2 0 2 20 1 8 0 3 4 29 31

172 Find the value of N. N = 10**3 + 10**1 + 10**0 + 10**(-2)
3 103 2 0 3 24 2 22 0 2 3 20 21

173 U and V are two vectors. Which figure below represents U - V?
4 215 1 0 1 6 2 11 0 3 4 29 30

174 A half-turn about O is aplied to the figure above. Which of
4 215 2 0 4 24 4 22 0 3 4 28 29 31

175 On a number line two points A and B are given. The coordinate
5 207 2 0 3 3 0 11 0 3 4 27 29 31

176 Among the following lines D1, D2, D3, D4, D5, which has no
2 205 3 0 2 10 1 14 0 3 4 29 31

177 Candidate A received 70 percent of the votes cast in an
3 004 3 0 0 0 3 14 0 1 2 03 05 07 14 15 16

178 72% is equal to
1 004 1 0 0 0 2 1 0 1 2 03 06 14 15 43

179 What is 20 as a percent of 80?
3 004 1 0 0 0 0 34 1 1 2 03 06 14 15

180 $150 is divided in the ratio of 2 to 3. The smaller of the
3 004 2 0 0 0 4 32 0 1 2 07 13 15 16

181 A model boat is built to scale so that it is 1/10 as long as
2 004 3 0 0 0 0 14 0 1 2 07 13 15 16

182 Which of the following is thirty-seven thousandths?
4 003 1 0 0 0 2 2 0 1 1 03 06 12 15

183 74.236 rounded to the nearest hundredth is
4 003 2 0 0 0 3 25 0 1 1 01 12 15 16

184 The large square has area 1 square unit. The area of the
3 003 2 0 0 0 2 27 0 1 1 03 12 15 16

185 Which is the closest estimate for the answer to 5 3/7 + 6 5/8
3 002 2 0 0 0 1 3 0 1 1 01 10 15 16

186 1/2 * 1/4 is equal to
1 002 1 0 0 0 4 25 0 1 1 03 06 10 11 15 43

187 3/8 - 1/5 is equal to
2 002 1 0 0 0 1 13 0 1 1 03 06 10 11 15

188 The picture shows some black and some white marbles. Of all
4 002 1 0 0 0 4 1 0 1 1 03 06 10 11 15

189 1/5 is equal to
4 004 1 0 0 0 0 2 0 1 2 03 06 14 15 43

190 Cloth is sold by the square meter. If 6 square meters of
1 004 3 0 0 0 0 24 0 1 2 05 07 13 15 16

191 The price of an article was $100. The price was first
2 004 3 0 0 0 1 23 0 1 2 05 07 14 15 16

192 A car takes 15 minutes to travel 10 kilometers. What is the
2 004 3 0 0 0 1 25 0 1 2 03 05 07 13 15 16

193 (Trapezoid with dimensions) X is equal to
3 206 3 0 0 0 2 26 0 3 4 29 31

194 What is the area of triangle PQR?
3 404 2 0 0 0 1 29 0 5 5 37 38 40

195 A number x is multiplied by itself and the result is added to
5 104 2 0 0 0 1 5 0 2 3 18 20 21

196 The sentence 'A number x decreased by 6 is less than 12' can
3 106 2 0 0 0 0 35 0 2 3 19 20 21 44

197 The picture above shows how Pedro used a short tree to find
1 204 3 0 0 0 2 32 0 3 4 03 07 25 26 29 31 47

198 Which of the following patterns can be folded along the
3 212 4 0 0 0 3 4 0 3 4 29 31

199 The area of the shaded circle is what part of the area of the
3 404 3 0 0 0 4 9 0 5 5 37 38 40

2.2 POPULATION B

2.2.1 Key to Reading Cognitive Item Table

For each item the following information is available in the cognitive item table:

Sample item:

Line 1: 028 The graph of a function f has a point of inflection at
Line 2: 3 505 1 0 1 07 1 07 5 14 16 27

Line 1: International information

028--Item code

The graph of a function f...--Partial text

Line 2: International information

3--Correct response

505--Position in International Content Grid

1--Behavioural Category

0--Anchor item status, see below

1 07--Form and position of the item on the cross-sectional version of the study (i.e., Form 1 Item 7)

1 07--Form and position of the item on the longitudinal version of the study (i.e., Form 1 Item 7)

5--Stratum for crosssectional form construction

14 16 27--Subtest codes

Definitions:

Item code:

For Population B there are 136 items

Behavioural levels:

1 Computation
2 Comprehension
3 Application
4 Analysis

Anchor item status (An item that appeared in the First International Mathematics Study is an anchor item)

0 Not an anchor
1 Anchor item
2 Modified anchor item

Stratum for form construction:

1 Sets and Relations
2 Number Systems
3 Algebra
4 Geometry
5 Elementary Calculus
6 Probability and Statistics
7 Finite Math

Subtest codes:

These are the subtests as defined in the study. The number of subtest codes per item varies. The following subtest codes are used:

01 Sets and Relations
02 Number Systems
03 Number Systems (excluding Complex Numbers)
04 Complex Numbers
06 Algebra
07 Algebra (Computation)
08 Algebra (other than Computation)
09 Equations and Inequations
10 Geometry
11 Analytical Geometry
13 Trigonometry
14 Analysis
15 Functions
16 Differentiation
17 Integration
18 Calculus
19 Probability and Statistics
20 Calculator Use
21 Anchor Items
22 'New' Mathematics
25 Behaviour/Analysis
26 Higher Level Behaviours
27 Computation
28 Comprehension
29 Application

2.2.2 Cognitive Item Table

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001 If X and Y are sets, then (X U Y) intersects (X intersect Y)
4 102 2 2 2 11 2 11 1 01 21 22 28

002 For all rational numbers A,B,C and D, A - (B + (C - D))
2 201 1 0 2 01 2 01 2 02 03 27

003 An operation * (on the set of real numbers) is commutative if,
4 201 3 1 2 16 2 16 2 03 21 22 29

004 3a**1/2 x 3a**-1/2 =
5 204 1 0 6 01 6 01 2 07 27

005 Which of the following points lies in the region bounded by
1 305 2 0 1 14 1 14 3 08 09 29

006 The curve defined by y = 3x (x - 2)(2x + 1) intersects the x-axis
5 301 2 0 2 02 2 02 3 08 15 29

007 A stationer wants to make a card 8 cm long and of such a width
2 304 3 1 8 09 8 09 3 08 09 21 25

008 P is a polynomial in x of degree m, and Q is a polynomial
1 301 4 0 3 10 3 10 3 08 28

009 In a Cartesian coordinate system, what is the equation
2 403 2 1 3 17 3 17 4 09 11 21 29

010 In the interval 2 pi (le) x (le) 4 pi
3 406 3 0 6 05 6 05 4 09 13 20 29

011 L is the line determined by the equation ax + by = 0, and m is
5 403 3 0 7 13 7 13 4 10 11 27

012 Which of the following is (are) true for all values of theta
4 501 1 1 4 15 4 15 5 13 14 15 21 29

013 Which of the following could be a sketch of the graph
2 502 3 0 7 17 7 17 5 14 15 27

014 A function f is defined by f(x) = (3x + 1)**6.
3 504 1 0 6 04 6 04 5 14 16 27

015 Intgr (x - 1)**2 dx is equal to
3 507 1 1 1 05 1 05 5 14 17 21 28

016 Let a function f be defined by f(x,y) = x.
1 104 4 0 8 08 8 08 1 01 15 22 25

017 The number of pairs of integer values of x,y which satisfy
2 305 1 0 7 10 7 10 3 07 09 27

018 If z = cos(pi/6)+ i sin(pi/6) then z**3 is equal to
3 205 3 0 7 04 7 04 2 02 04 29

019 Which of the following (x - 1), (x - 2), (x + 2), (x - 4)
5 301 2 0 4 02 4 02 3 08 20 28

020 x and y are real numbers. The product of the matrices
4 306 3 2 3 12 3 12 3 08 22 29

021 According to the graph, (ax + b) (gt) (cx**2) when
2 304 4 0 8 13 8 13 3 08 09 25

022 The rectangular coordinates of three points in a plane
5 405 2 0 5 14 5 14 4 10 28

023 An angle theta is known to be between 90 degrees and 180 degrees
1 406 3 2 4 07 4 07 4 10 13 20 29

024 As line segment AB rotates about line segment AC in space
1 403 4 0 6 07 6 07 4 10 11 25

025 Which of the following is negative ?
3 501 1 0 4 03 4 03 5 10 13 20 27

026 Given log (base b) 2 = 1/3 , log (base b) 32 is equal to
4 501 3 1 8 15 8 15 5 14 21 29

027 Which of these is the sketch of the graph of the function f
2 501 3 0 1 01 1 01 5 14 15 29

028 The graph of a function f has a point of inflection at
3 505 1 0 1 07 1 07 5 14 16 27

029 The line z in the figure is the graph of y = f(x)
4 508 1 0 8 03 8 03 5 14 17 27

030 A set of 24 cards is numbered with the positive integers
4 601 1 1 4 14 4 14 6 21 27

031 The symbol P(intersects)Q represents the intersection
2 102 2 1 3 06 3 06 1 01 21 22 28

032 Given that the square root of 600 is approximately 24.4949
1 203 1 0 1 13 1 13 2 02 03 27

033 If a(subscript 1) = 1 and a(subscript n+1) = a(subscript n)
5 202 3 0 3 07 3 07 2 03 28

034 The complex number z = x + iy (where x and y are real numbers)
3 205 4 0 8 16 8 16 2 02 04 25

035 What are all values of x for which the inequality
2 304 2 1 5 05 5 05 3 08 09 21 28

036 P(n) = n**3 - 2n**2 - n + 2/(n**2 - 1)
3 302 1 0 8 04 8 04 3 07 27

037 The equation of line l is y = 4x - 5.
1 305 3 0 5 10 5 10 3 08 09 29

038 A certain number of students are to be accommodated in a hostel.
2 305 3 0 7 07 7 07 3 08 09 29

039 If cos theta = 1/2, then cos 2 theta
1 406 1 0 5 07 5 07 4 10 13 20 27

040 Point B is on line AC. If AC = 3AB, then C is
3 405 3 0 5 12 5 12 4 10 22 29

041 The graph of the curve y = (2x + 1) / (x**2 + 2x +3) intersects
5 501 1 0 7 12 7 12 5 14 15 27

042 The functions f and g are defined by f(x) = x - 1
4 502 2 0 8 12 8 12 5 14 15 22 28

043 The graph above is the representation of one of the following
5 501 3 1 7 05 7 05 5 14 15 21 29

044 The graph of the function f is shown above
4 508 3 0 6 13 6 13 5 14 17 29

045 Four persons whose names begin with different letters
2 601 1 2 2 12 2 12 6 19 21 27

046 A function f with domain (1,2,3) is defined
5 104 1 0 4 01 4 01 1 01 15 22 27

047 If 10**a = 4 then 10**(1 + 2a) is equal to
3 204 2 0 7 16 7 16 2 02 03 29

048 The speed of an object increases uniformly
4 203 3 0 4 09 4 09 2 02 03 20 29

049 8/(3-2**1/2) is equal to
2 303 1 0 3 08 3 08 3 07 27

050 Two mathematical models are proposed to predict the return y
5 304 2 0 2 08 2 08 3 08 09 22 29

051 A piece of wire 52 cm long is cut into two parts
2 305 4 0 6 15 6 15 3 08 09 25

052 Find the difference: (vector b) - (vector a) of the vectors
2 405 1 1 8 11 8 11 4 10 21 22 27

053 What is the equation in x and y of the curve
4 403 3 1 6 08 6 08 4 10 11 21 29

054 For what values of x does the function
1 501 2 1 4 10 4 10 5 14 15 21

055 The diagram shows the sketch of the graph of the cubic function f
3 501 2 0 2 05 2 05 5 15 28

056 A radioactive element decomposes according
1 501 3 1 3 13 3 13 5 14 15 21 29

057 If the graph of the equation y = 3x**3 + 6x**2 + kw + 9
5 505 1 0 3 04 3 04 5 14 16 29

058 The area enclosed between the curve y = x**4 - x**2
3 508 2 0 2 10 2 10 5 14 17 28

059 In the graph, rainfall (in centimetres) is plotted
2 602 1 0 1 08 1 08 6 19 27

060 The same test was given in two classes. The first class,
4 602 3 0 6 10 6 10 6 19 20 29

061 The inverse of the function [(-2,0),(-1,1),(0,2),(1,3)] is
2 104 1 0 3 14 3 14 1 01 15 22 27

062 If u = 3+i, and v = -2-2i, then u/v is equal to
2 205 1 0 3 02 3 02 2 02 04 27

063 A number is the multiplicative inverse
3 201 2 1 8 07 8 07 2 02 03 21 22 28

064 According to one plan for travelling to Mars,
5 202 4 1 5 02 5 02 2 02 03 21 25

065 If(x-1) / (x**2 + 3x +2) = p / (x+1) + q / (x+2)
1 302 1 0 4 12 4 12 3 07 27

066 The solution set for the equation (1-2x)(2+x) = 0
1 301 1 0 2 14 2 14 3 07 09 27

067 If x is a real number, then y defined by
4 303 3 0 5 03 5 03 3 08 29

068 In the figure above, (line segment)PG (is perpendicular to)
3 406 1 2 6 09 6 09 4 10 13 21 27

069 One side of an equilateral triangle lies along the x-axis
1 403 3 0 2 09 2 09 4 10 11 29

070 If xy = 1 and x (gt) 0, which of the following statements is true
5 502 2 1 1 10 1 10 5 14 15 21 28

089 A warning system installation consists of two independent alarms
1 601 3 0 4 11 4 11 6 19 20 29

090 If n distinct points are marked on a circle
5 701 2 0 5 09 5 09 7 28

091 A function f is defined by f(x) =
1 104 3 0 4 05 4 05 1 01 15 22 29

092 The complex number (1+i)**2 is equal to
3 205 1 1 4 13 4 13 2 02 04 21 27

093 Z is a complex number with the modulus (2**1/2)
2 205 2 0 1 09 1 09 2 02 04 28

094 If a is a digit, let .a represent the number
4 203 4 0 6 11 6 11 2 02 03 25

095 When (1+p)**6 is expanded, the coefficient of
3 301 1 1 5 16 5 16 3 07 21 27

096 Given that a (gt) 0, (a**5)**1/6 is equal to
1 303 2 0 1 02 1 02 3 08 28

097 A freight train travelling at 50 kilometres per hour
4 304 3 1 6 12 6 12 3 08 09 20 21 29

098 PQRSTU is a regular hexagon in which PQ represents
5 405 2 0 7 15 7 15 4 10 22 28

099 If UV = 2, YZ = 3, XU z = 3 and UV parallel to YZ,
4 401 1 0 1 03 1 03 4 10 27

100 R is a vector which can be expressed as
1 405 4 0 1 16 1 16 4 22 25

101 Lim(2x+1)(x+1)/(3x**2-2) is equal to
2 503 2 0 6 02 6 02 5 14 20 28

102 The function f, defined by f(x) [(x-1)(3x+1)] / [2x-1)(x-2)]
5 502 4 0 5 11 5 11 5 14 15 25

103 Intgr 1-2 (x**3 - x)dx is equal to
3 506 3 0 1 04 1 04 5 14 17 29

104 At which point does the curve y= 3x**2 - x**3
5 505 1 0 2 15 2 15 5 14 16 27

105 How many four digit numbers less than 2467
1 701 3 0 7 03 7 03 7 29

106 The function f is defined by f(x) = e
3 504 1 0 3 15 3 15 5 14 16 27

107 Intgr [(x-1)**1/2]dx is equal to
1 506 1 0 6 17 6 17 5 14 17 27

108 The value of lim(h - 0)[(2+h)**1/2 - 2**1/2)] / h is
2 503 2 1 7 08 7 08 5 14 20 21 28

109 Given that 3 (x) f'(x) = x**2 - 5, and f(2) = 1,,
5 506 3 1 5 04 5 04 5 14 17 21 29

110 The function f is defined for all real numbers by
2 503 3 0 4 17 4 17 5 14 22 29

111 The intersection of a cylinder with a plane through
4 505 4 0 3 16 3 16 5 14 16 25

112 The function f defined by f(x) = x**4 + 4x**3 + 4x**2 +5
2 505 1 0 5 13 5 13 5 14 16 27

113 Intgr 1-2 [x - (1/x**2)]dx is equal to
2 506 1 0 4 04 4 04 5 14 17 28

114 The function f is defined by f(x) = intgr 0-x [(1 + u**2)**1/2]**1
5 506 2 0 5 06 5 06 5 14 17 28

115 This figure shows the graph of y = f(x), a being less than b.
3 508 2 1 3 03 3 03 5 14 17 21 28

116 Intgr 0-1 [12x / (2x**2 + 1)**2] is equal to
3 506 2 0 2 07 2 07 5 14 17 28

117 The curve defined by y= x**3 - ax + b has a relative minimum
3 505 3 0 7 11 7 11 5 14 16 29

118 If x = 2cos t and y = sin t, find dy/dx
4 504 3 0 5 15 5 15 5 14 16 29

119 Which of the following graphs has these features:
1 505 4 0 4 16 4 16 5 14 16 25

120 The area enclosed between the curve y = 2x**3 - 6x**2 + 3
5 508 1 0 8 06 8 06 5 14 27

121 The mappings F, G, H from the real line R
5 403 1 0 6 14 6 14 4 27

122 F is an even function and is differentiable at 0.
4 505 2 0 5 17 5 17 5 14 16 22 28

123 Which complex transformation is associated with
1 409 3 0 3 09 3 09 4 10 22 29

124 In the affine Euclidean plane, the coordinates
3 505 1 0 4 06 4 06 4 14 16 22 27

125 An examination consists of 13 questions
3 701 2 0 8 10 8 10 7 28

126 In the Euclidean plane, the coordinates of a moving point m
4 406 2 0 7 09 7 09 4 10 28

127 5**2n + 5**n, where n is a natural number
4 202 3 0 2 13 2 13 2 29

128 In the plane E, T(subscript v) is the translation
3 409 3 0 1 11 1 11 4 10 22 29

129 In how many ways can one arrange on a bookshelf
1 701 3 0 1 06 1 06 7 29

130 Let l and m be two intersecting lines in the Euclidean plane
2 409 1 0 6 06 6 06 4 10 29

131 Consider the three points in the Euclidean plane:
4 403 2 0 4 08 4 08 4 10 11 29

132 Let f be the mappings from the complex plane c
5 409 2 0 5 08 5 08 4 10 28

133 For which of the following values of m is
2 403 1 0 7 14 7 14 4 10 27

134 Let e be the Euclidean plane and f be the mapping
5 409 1 0 2 03 2 03 4 10 22 29

135 If z =(3**1/2 +i)/2, then z**60 is equal to
5 205 2 0 3 11 3 11 2 02 04 28

136 Consider the subspaces of the vector space R(3)
4 405 2 0 8 05 8 05 4 28

3. Definitions of International Subtests

3.1 POPULATION A

(199 items)

Content: Arithmetic

001 Natural numbers

N items = 10

Items are:

ID	Partial text
001	(22 * 18) - (147 + 59) is equal to
002	Matchsticks are arranged as follows. If the pattern is
041	1054 - 865
042	Which of the following is equal to a quarter of a million
073	162 * 47 is equal to
074	(Triangular array of 1's) What is the sum of the 50th row?
105	Which of the following is (are) true?
106	Peter and Paul decided to start saving money. Peter can save
136	Which of the following operations with whole numbers will
138	A group of children was divided into 7 teams with nine in

002 Common fractions

N items = 12

Items are:

ID	Partial text
003	2/5 + 3/8 is equal to
004	Which of the following is a pair of equivalent fractions?
043	Which of the points A, B, C, D, E on this number line
044	There are 35 students in a class. 1/5 of them come to school
075	In the figure the little squares are all the same size and
076	Four 1-liter bowls of ice cream were set out at a party
107	1 2/5 - 1/2 is equal to
139	(3/5)/(2/7) is equal to
*185	Which is the closest estimate for the answer to 5 3/7 + 6 5/8
*186	1/2 * 1/4 is equal to
*187	3/8 - 1/5 is equal to
*188	The picture shows some black and some white marbles. Of all

003 Decimal fractions

N items = 13

Items are:

ID	Partial text
005	0.40 * 6.38 is equal to
006	Alexander walked from Riverview to Bridgeport, which are
007	(847.36) in the number in the box, the digit 6 represents
045	The value of 0.2131 * 0.02958 is approximately
077	The position on the scale indicated by the arrow is
078	A runner ran 3,000 meters in exactly 8 minutes. What was
108	.004)24.56. In the division above, the correct answer is
109	In a discus-throwing competition, the winning throw was 61.60
140	7 3/20 is equal to
141	The speed of sound is approximately 340 meters per second
*182	Which of the following is thirty-seven thousandths?
*183	74.236 rounded to the nearest hundredth is
*184	The large square has area 1 square unit. The area of the

004 Ratio, proportion, percentage

N items = 17

Items are:

ID	Partial text
008	In a school of 800 pupils, 300 are boys. The ratio of the
009	30 is 75% of what number?
046	20% of 125 is equal to
047	If the ratio of 2 to 5 equals the ratio of n to 100, then in
079	A painter is to mix green and yellow paint in the ratio of
110	In a school election with three candidates, Joe received 120
142	The table above shows the values of x and y, where x is
143	If there are 300 calories in 100 grams of a certain food,
*177	Candidate A received 70 percent of the votes cast in an
*178	72% is equal to
*179	What is 20 as a percent of 80%?
*180	$150 is divided in the ratio of 2 to 3. The smaller of the
*181	A model boat is built to scale so that it is 1/10 as long as
*189	1/5 is equal to
*190	Cloth is sold by the square meter. If 6 square meters of
*191	The price of an article was $100. The price was first
*192	A car takes 15 minutes to travel 10 kilometers. What is the

005 Number theory

N items = 3

Items are:

ID	Partial text
080	Which of these numbers is a prime number?
111	Which of the following equals 7 * (3 + 9)?
144	One bell rings every 8 minutes, a second bell rings every 12

006 Exponents

N items = 3

Items are:

ID	Partial text
010	The value of 2**3 * 3**2 is
048	If 10**2 * 10**5 is equal to
012	3.23 * 10**5 is equal to

008 Square roots

N items = 3

Items are:

ID	Partial text
011	What is the square root of 12 * 75?
081	Since 4 * 9 = 36, the square root of 36 is equal to
145	The square root of 75 is between

009 Dimensional analysis

N items = 1

Items are:

ID	Partial text
146	Find the sum: 3 weeks 5 days + 9 weeks 6 days

Content: Algebra

101 Integers

N items = 7

Items are:

ID	Partial text
012	(-2) * (-3) is equal to
013	The air temperature at the foot of a mountain is 31 degrees.
049	-5(6 - 4) is equal to
050	John is 4 years older than Ellen and Ellen is 11 years
082	The set of integers less than 5 is represented on one of the
113	(-6) - (-8) is equal to
114	The first error, if any, in this reasoning occurs in

102 Rationals

N items = 4

Items are:

ID	Partial text
104	Which of the following sequences of numbers is in the order
051	A student's solution to the problem...check the student's
083	a, b, and c are numbers greater than 0. Which of these is
147	(-3/40 - (- 1/8) =

103 Integer exponents

N items = 2

Items are:

ID	Partial text
084	0.00046 is equal to
172	Find the value of n. n = 10**3 + 10**1 + 10**0 + 10**(-2)

104 Formulas

N items = 9

Items are:

ID	Partial text
015	Simplify: 5x + 3y + 2x - 4y
016	Soda costs a cents for each bottle, but there is a refund
052	The cost of printing greeting cards consists of a fixed
085	If y dollars are shared equally among four boys, how many

115 If x = 3, the value of - 3x is
116 If x = y = z = 1, then 9x - z) / (x = y) is equal to
148 Which of the following is false when a, b, and c are
149 A shopkeeper has x kg of tea in stock. He sells 15 kg and
*195 A number x is multiplied by itself and the result is added to

105 Polynomials

N items = 3

Items are:

ID	Partial text
053	When x = 2, (7x + 4) / (5x - 4) is equal to
088	a/15 - b/5 is equal to
150	12x = 16y =

106 Equations and inequations

N items = 9

Items are:

ID	Partial text
017	If p = lw and if p = 12 and l = 3, then w is equal to
018	The error in the above reasoning, if one exists, first
054	Which equation is true for all values of n?
086	If 4x/12 = 0, then x is equal to
087	The Davis family took a car trip from Anabru through Bergen
117	Six times a certain number (call it q) equals the sum of
118	(x/2) 7 is equivalent to
151	If 5x + 4 = 4x - 31, then x is equal to
*196	The sentence 'A number x decreased by 6 is less than 12' can

107 Relations and functions

N items = 4

Items are:

ID	Partial text
019	The table below compares the height from which a ball is
055	For the table shown, a formula that could relate m and n is
119	If y = 2x - 5 and x = 2, then y =
152	A bowling ball travels 4 meters per second. The distance in

110 Finite sets

N items = 1

Items are:

ID	Partial text
020	There are 9 elements in set Q and 6 in set R. How many
056	Which one of the following diagrams illustrates the statement
120	The symbol P intersect Q represents the intersection of sets
153	There are 227 boys in a school. Every boy in the school

Content: Geometry

201 Classification of plane figures

N items = 6

Items are:

ID	Partial text
021	A quadrilateral must be a parallelogram if it has
022	AB, DC, AD, EF are intersecting straight lines as shown
057	The figure QRST is a square an PQT and PQT an equilateral triangle
089	AR // DC and AD // BC. Quadrilateral ABCD is a
121	Which of the indicated angles is acute?
154	Four identical equilateral triangles have been arranged as

202 Properties of plane figures

N items = 8

Items are:

ID	Partial text
023	The length of the circumference of the circle with center at
058	Lines AB and CD are parallel. Two angles whose measures
059	Three straight lines intersect as shown in the diagram.
190	The line M is a line of symmetry for figure ABCDE. The
122	(Triangle with 2 angles given) X is equal to
123	In a quadrilateral, two of the angles each have measure of
128	If, in the given figure, PQ and RS are intersecting straight
155	If AB is a straight line, what is the measure in degrees of

203 Congruence of plane figures

N items = 4

Items are:

ID	Partial text
024	If segment PQ were drawn for each figure shown below, it
025	The triangles shown above are congruent. The measures of
091	One of the following figures is congruent with the figure
124	If the triangles above are congruent and M angle A =

204 Similarity of plane figures

N items = 6

Items are:

ID	Partial text
026	On level ground, a boy 5 units tall cast a shadow 3 units
060	Two of these triangles are similar. They are
092	If triangle XYZ is a triangle similar to triangle ABC but
125	If two triangles are similar, which of the following
156	Triangles PQR and STU are similar. How long is SU?
*197	The picture above shows how Pedro used a short tree to find

205 Geometric constructions

N items = 1

Items are:

ID	Partial text
176	Among the following lines D, D2, D3, D4, D5, which has no

206 Pythagorean triangles

N items = 3

Items are:

ID	Partial text
027	Right triangle with 2 sides given what is the value of S?
093	Which of these is a correct statement for this triangle?
8193	(Trapezoid with dimensions) X is equal to

207 Coordinates

N items = 7

Items are:

ID	Partial text
028	What are the coordinates of point P?
029	One of the following points can be joined to the point (-3,4)
061	If S is the set of points with x-coordinates greater than 3
094	In the diagram, OPQR is a parallelogram, O is the origin
126	The straight line joining the points 92, 30 and 92, 70 cuts
169	Suppose you start at point M (-1,-1), move a distance of one
175	On a number line two points A and B are given. The coordinate

208 Simple deductions

N items = 2

Items are:

ID	Partial text
062	In the above rectangle the measure of angles ROQ
095	Which statement can be used to find the value of Y?
127	In the above diagram, triangles ABC and DEF are congruent,

209 Informal transformations

N items = 54

Items are:

ID	Partial text
157	If triangle PRS maps onto triangle PR'S under a reflection
030	In which diagram below is the second figure the image of the
063	PQRS is a rectangle. Its image after a transformation is
096	Triangle ABC and triangle A'B'C' are congruent and their
158	Triangle POT can be rotated (turned) onto triangle SQR. The

211

N items = 1

Items are:

ID	Partial text
064	What is the name of the solid figure, each of whose faces

303 Representation of data

N items = 7

Items are:

ID	Partial text
033	The circle graph shows the proportion of various grain crops
034	Which of these is a true statement about the information
066	The graph shows the distance traveled by a tractor during a
098	Here is a table of data and a graph of the same data. What is
129	There are 7,000,000 girls under the age is a country
160	Three hours after starting, car a is how many km ahead of car
161	How much longer does it take for car b to go 50 kilometers

304 Interpretation of data

N items = 6

Items are:

ID	Partial text
035	The arithmetic mean (average of: 1.50, 2.40, 3.75) is equal to
067	Joe had three test scores of 78, 76 and 74, while Mary had
099	In the graph, rainfall in centimeters is plotted for 13 weeks
130	The weight gain from 6 to 10 months was
132	A team scores an average of 3 points per game over 5 games
162	The graph shows the time of travel by pupils from home to

306 Outcomes and events

N items = 1

Items are:

ID	Partial text
163	There are five black buttons and one red button in a jar. If

Content: Measurement

401 Standard units

N items = 5

Items are:

ID	Partial text
036	Which of the following is...to the weight of a normal man?
068	The distance between two towns is usually measured in

100 2 meters + 3 millimeters is equal to
101 A 15 centimeter piece is cut from a ribbon 1 meter long. What
133 How many pieces of pipe each 20 meters long would be required

402 Estimation

N items = 6

Items are:

ID	Partial text
038	On the above scale the reading indicated by the arrow is
069	The length of AB is 1 unit. Which is the best estimate for
102	The measure of the angle shown is nearest to
134	Each of the small squares in the figure is 1 square unit
164	According to the scale shown, the length of side BC of a
167	The area of the shaded figure, to the nearest square unit, is

403 Approximation

N items = 3

Items are:

ID	Partial text
072	The figure above shows a rectangular box. Which of the
135	The length of a box was measured and found to be 9 cm to the
165	Which of the following is the closest approx. to the area of

404 Determination of measures (areas, volumes, etc.)

N items = 11

Items are:

ID	Partial text
037	The total area of the two triangles is
039	What is the volume of a rectangular box with interior
040	There is a brass plate of the shape and dimensions shown in
070	What is the area of the above parallelogram?
071	The rectangle shown above is cut along the dotted lines, and
103	A square is removed from the rectangle as shown. What is the
104	Michael has a large number of wooden blocks which are cubical
136	What is the capacity of a cubic container 10 cm by 10 cm by
166	What is the surface area of this solid rectangular box?
168	A solid plastic cube with edges 1 cm long weighs 1 gram.
*194	What is the area of triangle rod?
*199	The area of a shaded circle is what part of the area of the

*In longitudinal version of test only. Not included in international subscores.

3.2 POPULATION B

(136 Items)

Content: Sets and Relations

102 Set Operations

N Items = 2

Items are:

ID	Partial test
001	If x and y are sets, then (x U y) intersects (x intersect y)
031	The symbol (p(intersects)q) represents the intersection

104 Functions

N Items = 5

Items are:

ID	Partial text
016	Let a function f be defined by f(x,y) = x. Let g =
046	A function f with domain (1,2,3) is defined
061	The inverse of the function -(-2,0), (-1,1), (0,2), (1,3)-
076	A real valued function f defined on a set of real numbers
091	A function f is defined by f(x) =

Content: Number Systems

201 Common Laws for Number Systems

N Items = 3

Items are:

ID	Partial text
002	For all rational numbers a,b,c and d, a - (b + (c - d)) is
003	An operation * (on the set of real numbers) is commutative
063	A number is the multiplicative inverse

202 Natural Numbers

N Items = 4

Items are:

ID	Partial text
033	If a(subscript 1) = 1 and a(subscript n+1) = a(subscript n)
064	According to one plan for travelling to Mars,
078	If a = 2**3 (x) 5**2 (x) 7 and b = 3**2 (x) 5**3 (x) 7**2 (x)
*127	5**2n + 5**n, where n is a natural number

203 Decimals

N Items = 3

Items are:

ID	Partial text
032	Given that the square root of 600 is approximately 24.4949
048	The speed of an object increases uniformly
094	If a is a digit, let .a represent the number

204 Real Numbers

N Items = 3

Items are:

ID	Partial text
004	3a**1/2 x 3a**-1/2 =
047	If 10**a = 4 then 10**(1 + 2a) is equal to
077	If 3**(x+y) = 81 and 25** (x/2) = 5,

205 Complex Numbers

N Items = 6

Items are:

ID	Partial text
018	If x = cos(pi/6) + i sin(pi/6) then z**3 is equal to
034	The complex number z = x + iy (where x and y are real numbers)
062	If u = 3+i, and v = -2-2i, then u/v is equal to
092	The complex number (1+i)**2 is equal to
093	Z is a complex number with the modulus (2**1/2)
135	If z =(3**1/2 +1)/2, then z**60 is equal to

Content: Algebra

301 Polynomials

N Items = 6

Items are:

ID	Partial text
006	The curve defined by y = 3x (x - 2)(2x + 1) intersects the x
008	P is a polynomial in x of degree m, and q is a polynomial
019	Which of the following (x - 1), (x - 2), (x + 2), (x - 4) are
066	The solution set for the equation (1-2x)(2+x) = 0
079	If 2x**2 - 12x + 9 = 2(x-a)**2 + b then
095	When (1+p)**6 is expanded, the coefficient of

302 Quotients of Polynomials

N Items = 2

Items are:

ID	Partial text
036	P(n) = n**3 - 2n**2 - n + 2/(n**2 - 1)
065	If (x-1) / (x**2 + 3x +2) = p / (x+1) + q / (x+2)

303 Roots and Radicals

N Items = 5

Items are:

ID	Partial text
049	8/(3-2**1/2) is equal to
067	If x is a real number, then y defined by
080	If x (gt) 0, y (gt) 0, and x (ne) y
081	If x and y are real numbers, for which x can you define y
096	Given that a (gt) o, (a**5)**1/6 is equal to

304 Equations and Inequalities

N Items = 6

Items are:

ID	Partial text
007	A stationer wants to make a card 8 cm long and of such a width
021	According to the graph, (ax + b) (gt) (cx**2) when
035	What are all values of x for which the inequality

050 Two mathematical models are proposed to predict the return
082 For the equation x**2 - 5x + 6 = 0
097 A freight train travelling at 50 kilometers per hour

305 Systems of Equations and Inequalities

N Items = 5

Items are:

ID	Partial text
005	Which of the following points lies in the region bounded by
017	The number of pairs of integer values of x, y which satisfy
037	The equation of line 1 is y = 4x - 5
038	A certain number of students are to be accommodated in a
051	A piece of wire 52 cm long is cut into two parts

306 Matrices

N Items = 1

Items are:

ID	Partial text
020	x and y are real numbers. The product of the matrices

Content: Geometry

401 Euclidean Geometry

N Items = 1

Items are:

ID	Partial text
099	If UV = 2, YZ = 3, XU z = 3 and UV parallel to YZ,

403 Analytic Geometry in the Plane

N Items = 9

Items are:

ID	Partial text
009	In a Cartesian coordinate system what is the equation
011	L is the line determined by the equation ax + by = 0, and m
024	As line AB rotates about line AC in space keeping an angle
053	What is the equation in x and y of the curve
069	One side of an equilateral triangle lies along the x-axis
083	The slope of the line through the two points (-1,3) and (4,-

*121 The mappings F, G, H from the real line R
131 Consider the three points in the Euclidean plane:
133 For which of the following values of M is

405 Vector Methods

N Items = 6

Items are:

ID	Partial text
022	The rectangular coordinates of three points in a plane
040	Point B is on line AC. If AC = 3AB, then C is
052	Find the difference: (vector B) - (vector A) of the vectors
098	PQRSTU is a regular hexagon in which PQ represents
100	R is a vector which can be expressed as
*136	Consider the subspaces of the vector space R(3)

406 Trigonometry

N Items = 7

Items are:

ID	Partial text
010	In the interval 2 pi (le) x (le) 4 pi
023	An angle theta is known to be n between 90 degrees and 180
039	If cos theta = 1/2, then cos 2 (x) theta
068	In the figure above, (line segment)PQ (is perpendicular to)
084	Which of the following pairs of angles can be used
085	In any triangle ABC, if A, B, and C are the lengths
126	In the Euclidean plane, the coordinates of a moving point m

409 Transformational Geometry

N Items = 5

Items are:

ID	Partial text
123	Which complex transformation is associated with
128	In the plane E, T(subscript v) is the translation
130	Let L and M be two intersecting lines in the Euclidean plane
132	Let F be the mappings from the complex plane C
134	Let E be the Euclidean plane if F be the mapping

Content: Elementary Functions/Calculus

501 Elementary Functions

N Items = 11

Items are:

ID	Partial text
012	Which of the following is (are) true for all values of theta
025	Which of the following is negative?
026	Given log (base b) 2 = 1/3, log (base b) 32 is equal to
027	Which of these is the sketch of the graph of the function f
041	The graph of the curve y = (2x + 1) / (x**2 + 2x +3) intersects
043	The graph above is the representation of one of the following
054	For what values of x does the function
055	The diagram shows the sketch of the graph of the cubic function
056	A radioactive element decomposes according
071	Let y = 4x**3, with x and y taking positive real values
087	If log n = n', then log n**2 is equal to

502 Properties of Functions

N Items = 4

Items are:

ID	Partial text
013	Which of the following could be a sketch of the graph
042	The functions f and g are defined by f(x) = x -1
070	If xy = 1 and x (gt) 0, which of the following statements is
102	The function f, defined by f(x) -(x-1)(3x+1)- / -(2x-1)(x-2)-

503 Limits and Continuity

N Items = 4

Items are:

ID	Partial text
086	The sum of the infinite geometric series
101	Lim(2x+1)(x+1)/(3x**2-2) is equal to
108	The value of lim(h - 0)-(2+h)**1/2 - 2**1/2)- / h is
110	The function f is defined for all real numbers by

504 Differentiation

N Items = 4

Items are:

ID	Partial text
014	The function f is defined by f(x) = (3x + 1)**6.
072	The derivative with respect to x of
106	The function f is defined by f(x) = e
118	If x = 2cos t and y = sin t, find dy/dx

505 Application of the Derivative

N Items = 10

Items are:

ID	Partial text
028	The graph of a function f has a point of inflection at
057	If the graph of the equation y = 3x**3 + 6x**2 + kw + 9
088	The velocity of a body moving in a straight line
104	At which point does the curve y = 3x**2 - x**3
111	The intersection of a cylinder with a plane through
112	The function f defined by f(x) = x**4 + 4x**3 + 4x**2 + 5
117	The curve defined by y = x**3 - ax + b has a relative minimum
119	Which of the following graphs has these features:
122	f is an even function and is differentiable at 0.
124	In the affine Euclidean plane, the coordinates

506 Integration

N Items = 6

Items are:

ID	Partial text
103	Intgr 1-2 (x**3 - x)dx is equal to
107	Intgr -(x-1)**1/2-dx is equal to
109	Given that 3 (x) f'(x) = x**2 - 5, and f(2) = 1,
113	Intgr 1-2 -x - (1/x**2)-dx is equal to
114	The function f is defined by f(x) = intgr 0-x -(1 + u**2)**1-
116	Intgr 0-1 -12x / (2x**2 + 1)**2- is equal to

507 Techniques of Integration

N Items = 2

Items are:

ID	Partial text
015	Intgr (x - 1)**2 dx is equal to
073	The value of intgr 0-1 -dx/(x**2 - 5x +6)- is

508 Applications of Integration

N Items = 5

Items are:

ID	Partial text
029	The line z in the figure is the graph of y = f(x)
044	The graph of the function f is shown above for
058	The area enclosed between the curve y = x**4 = x**2
115	This figure shows the graph of y = f(x), a being less than b
120	The area enclosed between the curve y = 2x**3 - 6x**2 + 3

Content: Probability and Statistics

601 Probability

N Items = 3

Items are:

ID	Partial text
030	A set of 24 cards is numbered with the positive integers
045	Four persons whose names begin with different letters
089	A warning system installation consists of two independent al

602 Statistics

N Items = 3

Items are:

ID	Partial text
059	In the graph, rainfall (in centimeters) is plotted
060	The same test was given in two classes. The first class,
074	The mean of a population is 5 and its standard deviation is

603 Distributions

N Items = 1

Items are:

ID	Partial text
075	A test is taken by all first year university students in a c

Content: Finite Math

701 Combinatorics

N Items = 4

Items are:

ID	Partial text
090	If n distinct points are marked on a circle
105	How many four digit numbers less than 2467
125	An examination consists of 13 questions
129	In how many ways can one arrange on a bookshelf

*Not included in international subscores.

4. Appropriateness Ratings Tables

4.1 POPULATION A

ID	BFL	BFR	CBC	CON	ENW	FIN	FRA	HKO	HUN	IRE	ISR	JPN	LUX	NTH	NZE	SCO	SWA	SWE	THA	USA
001	1	1	2	2	2	1	1	1	1	2	1	1	1	1	1	1	2	2	1	1
002	0	0	2	2	2	1	0	1	1	2	1	2	0	0	1	1	0	1	1	1
003	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	1	1	1	2	1
004	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
005	1	1	2	2	2	1	1	1	1	2	1	1	1	1	1	1	1	1	2	2
006	1	1	2	2	2	1	1	0	1	2	1	1	1	1	1	1	1	1	2	1
007	2	2	2	2	2	0	2	0	1	2	1	1	1	1	2	1	1	1	2	2
008	1	1	2	2	2	1	2	1	1	2	1	1	1	1	1	1	2	1	2	2
009	0	0	2	2	2	0	2	2	1	2	1	1	1	1	1	1	2	1	1	2
010	2	2	2	2	2	2	2	2	1	2	1	1	1	2	1	1	2	2	1	1
011	1	1	2	2	0	0	1	0	1	0	0	0	2	1	0	1	0	0	1	1
012	1	1	2	2	2	2	1	2	1	2	1	1	1	1	1	1	2	2	2	0
013	1	1	2	2	2	1	1	1	1	2	1	1	1	2	1	1	1	2	2	1
014	2	2	2	2	1	2	1	2	1	2	1	1	1	1	1	1	1	2	2	1
015	2	2	2	2	1	2	1	2	1	2	1	1	1	1	1	1	2	1	0	1
016	2	2	2	2	2	0	1	2	1	2	1	1	0	1	1	1	0	0	1	1
017	2	2	0	2	2	0	2	0	1	2	1	1	1	1	1	1	2	2	2	1
018	2	2	2	2	2	1	2	2	1	2	1	2	1	1	1	1	2	1	2	1
019	1	1	0	2	1	2	1	0	1	2	1	1	0	1	1	1	2	2	0	1
020	1	1	2	2	1	0	0	0	1	2	0	1	1	2	2	1	1	0	0	2
021	2	2	1	2	1	1	2	1	1	2	1	2	1	1	1	1	1	0	2	1
022	0	0	0	2	2	2	0	2	1	1	1	1	1	1	1	1	1	0	0	1
023	0	0	2	2	2	0	0	2	1	0	1	1	0	0	1	1	0	0	1	1
024	0	0	0	2	1	1	2	1	1	0	1	1	0	1	1	1	0	1	2	1
025	0	0	0	2	1	0	1	2	1	0	1	1	0	1	1	1	0	1	1	0
026	0	0	2	2	2	0	0	2	1	1	1	1	0	0	1	1	2	0	2	1
027	0	0	0	2	2	0	0	0	0	0	1	1	0	1	1	1	0	0	2	0
028	2	2	2	2	2	1	1	2	1	0	1	2	0	1	1	1	1	1	2	1
029	0	0	2	2	1	1	1	2	1	0	1	1	0	1	1	1	2	1	1	1
030	0	0	0	2	1	1	2	0	1	0	0	1	0	1	1	1	2	1	0	0
031	0	0	2	2	2	0	1	0	0	0	0	1	0	2	1	1	1	1	1	1
032	0	0	1	2	2	1	1	2	1	1	0	1	0	0	1	1	2	2	2	1
033	0	0	1	2	2	1	1	2	1	1	0	1	0	0	1	1	1	2	2	2
034	0	0	1	2	2	1	0	2	1	1	0	2	0	1	1	1	2	2	2	2
035	0	0	1	2	2	1	0	1	1	1	0	1	1	0	1	1	2	2	0	2
036	0	0	2	2	2	1	0	2	1	1	1	1	1	0	1	1	1	2	1	2
037	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	2	2	1
038	0	0	2	2	2	0	1	1	1	2	1	1	0	1	1	1	1	1	2	2
039	0	0	2	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	2	2
040	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	0	2	1
041	1	1	2	2	2	1	1	0	1	2	1	1	1	0	1	1	1	2	1	1
042	1	1	2	2	1	2	0	1	1	2	1	1	1	1	1	1	1	1	2	1
043	2	2	1	2	1	1	2	2	1	2	1	2	1	1	1	1	1	1	2	2
044	2	2	1	2	2	2	2	2	1	2	1	2	1	2	1	1	2	2	2	2
045	2	2	1	2	2	1	1	1	1	2	1	2	0	1	1	1	1	2	2	1
046	1	1	2	2	2	2	2	2	1	2	1	1	1	1	1	1	2	2	2	2
047	1	1	2	2	1	0	1	1	1	2	1	1	1	0	1	1	2	1	2	2

ID	BFL	BFR	CBC	CON	ENW	FIN	FRA	HKO	HUN	IRE	ISR	JPN	LUX	NTH	NZE	SCO	SWA	SWE	THA	USA
048	2	2	1	2	2	2	1	2	1	2	1	1	1	1	1	1	2	2	1	1
049	1	1	2	2	2	2	1	2	1	2	1	1	1	1	1	1	2	1	2	0
050	1	1	2	1	2	1	1	2	1	2	1	1	1	1	1	1	1	1	2	1
051	1	1	2	2	0	1	2	0	1	1	1	1	0	1	2	1	2	1	2	1
052	2	2	1	2	2	1	1	2	1	2	1	1	1	1	1	1	2	1	1	1
053	2	2	2	2	1	1	1	2	1	2	0	1	1	1	1	1	0	1	1	1
054	2	2	1	2	0	2	1	2	1	2	1	1	0	1	1	1	2	2	1	1
055	1	1	2	0	1	2	1	2	1	2	1	1	0	1	2	1	2	0	0	1
056	1	1	2	0	1	1	0	0	1	2	0	1	1	2	1	1	0	0	0	1
057	1	1	2	2	1	2	0	2	1	1	1	1	0	2	2	1	1	1	2	2
058	0	0	0	2	2	2	1	2	1	1	1	1	0	1	1	1	1	0	1	1
059	0	0	0	2	2	1	0	1	1	0	1	1	0	1	1	1	1	1	1	0
060	0	0	0	2	1	0	0	0	1	0	1	1	0	0	1	1	0	1	1	1
061	0	0	0	0	1	1	0	2	1	0	0	1	0	2	2	1	1	1	0	1
062	0	0	0	2	2	2	1	2	1	0	1	1	0	1	1	1	1	0	2	0
063	0	0	0	2	1	1	2	0	1	2	0	1	0	1	1	1	2	0	0	0
064	0	0	2	2	1	1	0	0	1	1	0	1	0	1	1	1	1	9	1	1
065	0	0	0	1	1	0	1	2	0	0	0	1	0	1	1	1	0	1	0	1
066	0	0	2	2	1	2	0	0	1	1	0	1	0	0	1	1	2	1	2	1
067	1	1	1	2	2	1	1	0	1	1	0	1	1	1	1	1	2	2	1	2
068	1	1	1	2	1	1	1	0	1	2	1	1	1	0	1	1	1	2	1	2
069	1	1	1	2	1	0	1	0	1	2	1	1	0	1	1	1	1	2	2	1
070	0	0	2	2	2	2	1	1	1	0	1	1	1	1	1	1	1	1	2	2
071	0	0	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	2	2	1
072	1	1	1	2	1	2	0	1	1	2	1	1	1	1	1	1	1	1	2	1
073	1	1	2	2	2	1	1	1	1	2	1	1	1	0	1	1	1	2	1	1
074	0	0	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0	1
075	1	1	2	2	2	1	1	1	1	2	1	1	1	1	1	1	1	2	2	2
076	0	0	2	2	2	1	1	1	1	2	1	1	1	1	1	1	1	2	2	2
077	2	2	1	2	2	2	1	2	1	2	1	1	1	1	1	1	1	2	2	1
078	1	1	1	2	2	1	1	1	1	2	1	1	2	1	1	1	1	2	2	2
079	1	1	2	2	2	0	2	1	1	2	1	1	0	0	1	1	2	1	2	2
080	1	1	2	2	1	1	1	1	1	2	0	1	2	1	1	1	1	1	1	1
081	0	0	1	2	1	0	0	1	0	0	1	0	2	1	0	1	0	0	1	1
082	1	1	1	2	1	0	1	2	1	2	1	1	1	1	1	1	1	2	1	1
083	1	1	2	0	0	1	1	2	1	2	0	1	1	1	1	1	2	1	2	1
084	0	0	2	0	2	0	2	2	0	2	1	1	0	0	1	0	0	1	0	1
085	2	2	2	2	2	1	1	2	1	2	1	1	2	1	1	1	1	1	1	1
086	2	2	0	2	1	1	2	2	1	2	1	1	2	1	1	1	2	9	1	1
087	2	2	1	2	2	0	1	2	1	2	1	1	1	0	1	1	1	1	2	2
088	2	2	0	0	1	0	2	2	1	2	0	1	2	0	1	0	2	0	0	0
089	1	1	2	2	1	1	0	1	1	2	1	1	0	1	1	1	1	1	1	1
090	1	1	2	2	1	2	2	2	1	0	1	1	0	2	1	1	1	1	1	1
091	0	0	1	2	1	1	1	2	1	0	1	1	0	1	1	1	0	0	2	1
092	0	0	0	2	1	0	0	2	1	0	1	1	0	0	1	1	0	1	2	0
093	0	0	2	2	1	0	0	0	1	0	1	0	0	1	0	1	0	0	2	1
094	0	0	0	1	1	1	2	2	1	0	1	1	0	1	1	1	2	1	2	0
095	0	0	2	2	1	2	0	2	1	1	1	1	1	1	1	1	1	1	2	1
096	0	0	0	2	1	1	2	0	1	0	1	1	0	0	1	1	2	1	0	0
097	0	0	2	2	1	1	0	2	1	1	0	1	0	1	1	1	2	1	2	1
098	0	0	2	0	0	1	0	1	1	1	0	1	0	0	1	1	2	1	2	1
099	0	0	1	2	1	0	0	2	0	0	0	1	0	0	1	1	2	1	0	2
100	1	1	2	1	1	2	0	1	1	2	1	1	1	1	1	1	1	1	2	1

ID	BFL	BFR	CBC	CON	ENW	FIN	FRA	HKO	HUN	IRE	ISR	JPN	LUX	NTH	NZE	SCO	SWA	SWE	THA	USA
101	0	0	2	2	2	2	0	1	1	2	1	1	0	0	1	1	1	1	2	2
102	1	1	0	2	2	2	1	1	1	0	1	1	0	2	1	1	1	2	2	1
103	0	0	2	2	1	2	1	1	1	2	1	1	1	1	1	1	1	1	2	2
104	1	1	2	2	2	9	1	1	1	2	1	1	1	1	1	1	1	2	2	1
105	1	1	1	2	1	1	1	1	1	2	1	1	1	2	1	1	2	2	2	1
106	2	2	2	2	2	1	1	2	1	2	1	1	1	1	1	1	1	2	2	2
107	2	2	1	2	2	1	2	1	1	2	1	1	1	1	1	1	1	2	2	1
108	1	1	2	2	2	1	1	1	1	2	1	1	1	1	1	1	2	2	2	2
109	1	1	2	2	2	2	0	1	1	2	1	1	1	1	1	1	1	1	1	2
110	1	1	2	2	2	1	1	2	1	2	1	1	1	1	1	1	2	2	2	2
111	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	2	2	2	2
112	2	2	2	2	2	1	1	2	0	2	1	1	1	1	1	1	2	2	2	1
113	1	1	2	2	1	2	1	2	1	2	1	1	1	2	1	1	2	2	2	0
114	2	2	0	0	0	0	1	2	1	1	1	1	1	1	1	1	0	1	0	0
115	1	1	2	0	1	2	1	2	1	2	1	1	1	1	1	1	2	1	2	0
116	2	2	1	2	2	1	1	2	1	2	0	0	1	2	1	1	0	1	2	1
117	2	2	2	2	1	1	1	2	1	2	1	1	0	1	1	1	2	0	2	0
118	2	2	0	2	1	1	2	0	1	1	0	1	0	1	1	1	2	1	0	0
119	2	2	2	2	1	2	1	2	1	2	1	1	0	2	1	1	2	0	2	1
120	2	2	1	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0
121	1	1	2	1	1	2	0	1	1	1	1	1	1	1	1	1	1	1	1	1
122	0	0	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1
123	0	0	0	2	1	2	2	2	1	1	1	1	1	1	1	1	1	0	1	0
124	0	0	2	1	0	1	0	2	1	0	1	1	1	1	1	1	0	1	2	1
125	0	0	0	2	1	0	0	2	1	0	1	1	0	0	1	1	0	1	2	1
126	0	0	0	1	1	2	1	1	1	0	1	1	1	2	1	1	2	1	2	0
127	0	0	0	2	1	2	0	2	1	0	1	1	0	1	1	1	0	0	2	0
128	0	0	2	2	2	2	0	2	1	1	1	1	1	1	1	1	1	1	2	1
129	0	0	1	1	1	1	1	2	1	0	0	1	0	0	1	1	1	1	2	1
130	1	1	2	2	1	1	0	2	1	1	0	1	1	1	1	1	2	1	2	1
131	0	0	2	2	0	1	0	2	1	1	0	1	0	1	1	1	2	1	2	1
132	0	0	2	1	2	1	0	1	1	1	0	1	1	1	1	1	2	1	1	1
133	1	1	2	2	2	2	0	1	1	2	1	1	0	1	1	1	1	1	1	1
134	1	1	2	1	1	2	0	1	1	1	1	1	1	2	1	1	1	1	2	1
135	0	0	2	1	2	2	1	1	1	2	1	1	1	1	2	1	1	1	2	1
136	1	1	2	2	1	2	1	1	1	2	1	1	1	1	1	1	0	2	1	1
137	1	1	0	2	1	1	1	2	1	2	1	1	1	1	1	1	1	1	0	1
138	2	2	2	2	1	1	0	1	1	2	1	1	1	1	1	1	1	2	1	1
139	2	2	2	2	2	0	2	1	1	2	1	1	1	1	1	1	2	1	2	1
140	2	2	1	2	1	1	2	2	1	2	1	1	1	1	1	1	1	2	2	1
141	1	1	2	2	1	1	0	1	1	2	0	1	1	1	1	1	0	2	2	2
142	1	1	2	2	1	0	1	1	1	2	1	1	1	1	1	1	0	1	0	2
143	1	1	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	0	2	2
144	1	1	0	2	1	1	1	2	1	2	0	1	1	1	1	1	1	1	2	2
145	0	0	2	1	1	0	0	1	0	0	1	0	2	1	0	1	0	0	2	1
146	1	1	2	1	1	2	0	1	1	2	1	1	1	1	1	1	1	0	2	1
147	2	2	2	0	1	1	2	2	1	1	1	1	1	1	1	1	0	1	2	1
148	2	2	0	2	1	1	1	0	1	2	0	1	1	0	1	1	1	0	2	1
149	2	2	2	2	2	2	2	2	1	2	0	1	0	1	1	1	2	0	2	0
150	2	2	1	0	1	0	2	1	1	2	0	1	0	1	1	1	2	1	2	1
151	2	2	1	0	2	2	2	2	1	2	1	1	2	1	1	1	2	2	2	0
152	2	2	1	2	1	2	1	2	1	2	1	1	2	1	1	1	2	2	2	1
153	2	2	2	0	1	2	0	0	1	2	0	1	1	1	1	1	0	0	0	1

ID	BFL	BFR	CBC	CCN	DNM	FIN	FRA	HKO	HON	IRE	ISR	JPN	LUX	NTH	NZE	SCO	SWA	SWE	THA	USA
154	0	0	1	2	1	1	2	0	1	1	1	1	0	1	1	1	1	1	0	0
155	0	0	1	2	1	1	1	2	1	1	1	1	2	1	1	1	1	0	2	1
156	0	0	0	2	1	0	0	2	1	0	1	1	0	0	1	1	0	1	2	1
157	0	0	1	2	0	1	2	0	1	0	0	1	0	2	1	1	2	1	0	0
158	0	0	0	2	1	0	0	2	1	0	0	1	0	1	1	1	2	0	0	0
159	0	0	0	2	0	1	0	0	1	1	0	2	0	1	1	1	0	1	2	1
160	0	0	2	2	1	2	0	1	1	0	0	0	0	1	1	1	2	1	2	1
161	0	0	1	2	1	2	0	1	1	0	0	0	0	1	1	1	2	1	2	1
162	1	1	2	2	1	1	0	2	1	1	0	0	0	1	1	1	2	1	2	1
163	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1
164	1	1	1	2	2	1	0	1	1	2	1	1	1	1	1	1	1	2	1	2
165	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2
166	1	1	1	2	1	2	0	2	1	2	1	1	1	1	1	1	0	1	2	1
167	1	1	2	2	2	1	0	1	1	1	1	2	1	1	1	1	1	1	2	2
168	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	0	2	2	1
169	0	0	0	0	1	1	1	2	1	0	1	1	0	0	1	1	2	0	1	1
170	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
171	2	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
172	0	0	1	0	1	1	1	0	0	1	1	0	1	0	1	0	2	2	0	0
173	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174	0	0	1	2	1	1	1	0	1	0	0	1	0	1	1	1	2	0	0	0
175	2	2	1	1	1	1	1	2	1	1	1	1	1	2	1	1	1	1	0	0
176	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0
177	1	1	2	2	9	9	1	9	9	9	9	1	9	9	9	2	9	9	2	2
178	1	1	2	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	2
179	1	1	2	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	2
180	1	1	2	2	9	9	1	9	9	9	9	1	9	9	9	2	9	9	2	2
181	1	1	2	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	2
182	2	2	2	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	1
183	2	2	2	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	2
184	2	2	9	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	1
185	2	2	2	2	9	9	2	9	9	9	9	2	9	9	9	2	9	9	2	2
186	2	2	2	2	9	9	2	9	9	9	9	2	9	9	9	2	9	9	2	2
187	2	2	2	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	1
188	2	2	2	2	9	9	2	9	9	9	9	2	9	9	9	2	9	9	2	2
189	1	1	2	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	2
190	1	1	2	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	2
191	1	1	2	2	9	9	1	9	9	9	9	2	9	9	9	2	9	9	2	1
192	2	2	2	2	9	9	2	9	9	9	9	1	9	9	9	2	9	9	2	2
193	0	0	2	2	9	9	0	9	9	9	9	1	9	9	9	1	9	9	2	0
194	1	1	1	2	9	9	1	9	9	9	9	1	9	9	9	1	9	9	2	1
195	2	2	2	2	9	9	1	9	9	9	9	1	9	9	9	2	9	9	2	0
196	2	2	2	2	9	9	1	9	9	9	9	1	9	9	9	2	9	9	2	0
197	0	0	2	2	9	9	0	9	9	9	9	1	9	9	9	1	9	9	2	1
198	0	0	2	2	9	9	1	9	9	9	9	1	9	9	9	2	9	9	1	1
199	1	1	2	2	9	9	1	9	9	9	9	1	9	9	9	1	9	9	2	1

4.2 POPULATION B

ID	BFL	BFR	CBC	CON	ENW	FIN	FRA	HKO	HUN	IRE	ISR	JPN	LUX	NZE	SCO	SWA	THA	USA
001	1	1	1	2	1	1	1	2	0	2	1	1	1	1	2	1	1	1
002	1	1	2	2	2	1	0	0	1	2	1	1	0	2	2	2	1	1
003	1	1	1	0	1	1	2	2	0	2	1	1	2	2	2	1	1	1
004	1	1	2	9	2	2	2	1	1	2	1	1	2	2	2	2	1	1
005	2	2	2	2	2	2	1	1	1	2	1	1	1	2	2	2	1	1
006	1	1	2	2	2	2	1	1	1	2	1	1	1	2	2	2	1	2
007	1	1	2	2	2	1	0	1	1	1	1	0	0	1	2	2	1	0
008	1	1	0	2	1	2	2	1	1	1	1	1	2	1	1	2	1	1
009	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	2	1	2
010	1	1	2	2	2	2	2	1	1	2	1	1	2	2	2	2	1	2
011	2	2	0	2	1	1	1	2	1	1	1	1	1	1	0	2	1	1
012	1	1	2	1	2	2	2	2	1	2	1	1	2	2	2	2	1	2
013	1	1	2	0	2	2	2	2	1	1	1	2	2	1	2	2	1	2
014	1	1	0	2	2	2	2	1	1	2	1	1	2	2	2	1	0	1
015	2	2	0	2	2	2	2	1	1	1	1	1	2	2	2	2	1	1
016	1	1	1	2	1	1	1	2	1	0	1	0	1	1	2	0	0	2
017	1	1	1	2	2	2	1	1	1	2	1	1	1	2	2	2	1	1
018	1	1	1	2	1	1	2	1	0	1	1	1	2	2	0	1	0	1
019	1	1	1	2	2	1	2	1	1	2	1	1	2	2	2	1	1	2
020	1	1	1	2	1	0	1	2	0	1	0	1	1	1	2	0	1	1
021	1	1	1	2	2	2	1	1	1	2	1	1	1	1	1	2	1	1
022	1	1	2	2	1	2	2	1	1	2	0	1	2	1	2	2	1	1
023	1	1	2	2	2	2	1	2	1	2	1	1	1	2	2	1	1	1
024	2	2	1	2	1	2	0	1	1	0	1	1	0	2	1	2	0	1
025	1	1	2	2	2	2	2	1	1	2	1	1	2	2	2	2	1	1
026	2	2	2	2	1	2	2	1	1	2	1	1	2	2	2	0	1	1
027	1	1	1	1	2	1	2	2	1	1	1	1	2	2	0	1	1	1
028	1	1	1	1	1	1	0	2	1	2	1	1	0	2	1	0	0	2
029	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	0	1
030	0	0	0	2	1	2	2	1	0	1	1	1	2	2	0	1	1	1
031	1	1	1	2	1	1	2	2	0	2	1	1	2	2	2	1	1	1
032	1	1	1	2	1	1	1	1	1	2	1	1	1	2	2	2	0	0
033	1	1	0	0	1	2	2	1	1	1	1	2	2	2	2	0	1	1
034	1	1	2	2	1	1	2	2	0	2	1	1	2	2	1	2	1	1
035	1	1	0	9	1	2	2	1	1	2	1	1	2	2	2	1	1	1
036	1	1	1	2	1	2	2	2	1	2	1	1	2	2	2	1	1	1
037	1	1	0	2	1	2	1	1	1	2	1	0	1	2	2	2	1	1
038	1	1	1	2	1	2	1	1	1	2	1	1	1	2	1	2	1	0
039	1	1	1	2	2	2	2	1	1	2	1	1	2	2	2	1	1	1
040	1	1	0	2	1	2	1	1	1	2	0	2	1	2	2	1	1	1
041	1	1	1	2	2	2	2	2	1	2	1	1	2	2	2	1	1	1
042	1	1	0	2	1	2	2	2	1	2	1	1	2	2	2	1	1	1
043	1	1	2	1	2	1	2	1	1	1	1	1	2	2	2	1	1	1
044	2	2	0	2	1	2	2	2	1	1	1	1	2	2	2	2	0	1
045	1	1	0	2	1	2	1	2	0	1	1	1	1	2	2	2	1	2
046	1	1	1	2	1	1	2	1	1	2	1	1	2	2	2	1	1	0
047	1	1	2	2	2	2	2	1	1	2	1	2	2	2	2	1	1	1
048	1	1	1	2	1	1	1	1	1	1	1	1	1	2	2	2	1	1
049	1	1	0	2	1	1	2	1	1	2	1	1	2	1	2	1	1	1

ID	BEL	DEN	CDC	CON	ENG	FIN	FRA	HKO	HUN	IRE	ISR	JPN	LUX	NZE	SCO	SWA	THA	USA
050	1	1	2	2	1	2	2	2	1	2	1	1	2	2	2	2	1	1
051	1	1	2	2	1	2	1	1	1	1	1	1	1	2	2	1	1	1
052	2	2	0	2	1	1	2	1	1	1	0	1	2	2	2	1	1	1
053	1	1	0	0	1	2	2	2	1	1	1	1	2	2	1	0	0	0
054	2	2	0	2	1	2	2	1	1	2	1	1	2	2	2	2	1	1
055	1	1	2	2	1	1	2	2	1	2	1	1	2	2	2	2	1	1
056	2	2	2	2	1	2	2	2	1	0	1	1	2	2	2	2	1	1
057	1	1	0	2	1	1	1	2	1	2	1	1	1	2	2	1	0	1
058	2	2	0	2	1	2	2	2	1	1	1	1	2	2	2	2	0	1
059	0	0	0	2	1	1	2	0	1	2	1	1	2	2	2	0	1	1
060	0	0	1	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1
061	1	1	2	2	0	1	1	1	1	2	1	2	1	2	2	0	1	1
062	1	1	2	2	1	1	2	1	0	2	1	1	2	2	1	2	1	1
063	1	1	2	2	1	1	1	1	0	2	1	0	1	2	2	0	1	1
064	1	1	2	2	1	2	1	1	1	2	1	1	1	2	2	1	1	1
065	2	2	2	2	1	1	2	2	1	1	1	1	2	2	1	1	1	1
066	1	1	2	2	2	2	2	1	1	2	1	1	2	2	2	1	1	1
067	1	1	2	2	2	2	2	1	1	2	1	1	2	2	2	1	1	1
068	1	1	2	2	2	2	0	1	1	2	1	1	0	2	2	1	1	1
069	2	2	2	2	2	2	1	2	1	2	1	1	1	2	2	1	1	1
070	1	1	2	2	1	2	1	1	1	2	1	1	1	2	1	1	1	1
071	2	2	1	0	1	2	2	1	1	0	1	1	2	9	2	1	0	0
072	1	1	0	2	1	2	2	2	1	1	1	1	2	2	2	1	0	1
073	2	2	0	2	1	1	0	2	1	1	1	1	0	2	0	0	0	1
074	0	0	0	2	1	1	2	2	0	2	1	2	2	2	0	2	1	1
075	0	0	0	2	1	1	9	2	0	1	0	1	0	2	0	2	1	1
076	1	1	1	2	0	1	2	2	1	1	1	1	2	1	2	1	1	1
077	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	1	1	1
078	1	1	2	2	1	1	2	1	1	2	1	1	2	2	1	1	1	1
079	1	1	2	2	2	1	2	1	1	2	1	1	2	2	2	1	1	1
080	1	1	2	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1
081	1	1	2	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1
082	1	1	2	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1
083	1	1	2	2	2	1	2	1	1	2	1	1	2	2	2	2	1	1
084	1	1	2	2	1	2	2	1	1	2	1	2	2	2	2	2	1	1
085	1	1	2	2	1	1	0	1	1	2	1	1	0	2	0	2	1	1
086	1	1	2	0	2	1	1	1	1	2	1	1	1	2	2	1	1	1
087	2	2	2	2	2	2	2	0	1	2	1	1	2	2	2	2	1	1
088	0	0	2	2	2	0	0	1	1	1	1	1	0	2	1	1	1	1
089	1	1	0	9	2	1	9	2	0	1	1	2	1	1	0	1	0	0
090	1	1	0	9	1	2	2	2	0	2	0	1	2	2	1	0	1	0
091	1	1	2	2	1	1	2	2	1	2	1	1	2	2	2	2	1	2
092	1	1	2	2	1	1	2	1	0	2	1	1	2	2	1	2	1	1
093	1	1	0	2	1	1	2	2	0	2	1	1	2	2	0	2	0	0
094	1	1	1	0	1	2	1	1	1	1	1	1	1	2	1	2	1	1
095	2	2	2	2	2	2	2	1	0	2	1	1	2	2	1	2	1	1
096	1	1	2	2	2	2	9	1	1	2	1	1	1	2	2	0	1	0
097	1	1	1	2	2	1	0	1	1	1	1	1	0	2	2	1	1	1
098	1	1	0	2	1	2	2	1	1	2	1	2	2	2	2	1	1	1
099	1	1	1	2	1	0	2	1	1	2	1	1	2	2	2	1	1	1
100	0	0	0	2	0	0	1	2	0	1	0	1	1	2	0	1	0	0
101	1	1	0	2	1	2	2	2	1	1	1	1	2	2	1	2	1	1
102	1	1	1	2	1	1	2	2	1	2	1	1	2	2	1	1	1	1

.C	BFL	BIR	C'G	CON	ENW	FIN	FRA	HKO	HUN	IRE	ISR	JPN	LUX	NZE	SCO	SWA	THA	USA
103	2	2	0	2	2	2	2	1	1	1	1	1	2	2	2	1	0	1
104	1	1	0	0	2	2	2	1	1	2	1	1	2	2	2	2	1	1
105	2	2	0	2	1	2	1	1	0	1	0	2	1	2	1	1	1	0
106	2	2	0	2	2	2	2	2	1	1	1	1	2	2	1	2	0	1
107	2	2	0	1	2	2	2	2	1	1	1	1	2	2	2	2	0	1
108	1	1	0	2	1	2	2	2	1	1	1	1	2	1	1	2	1	1
109	2	2	0	2	2	2	2	2	1	1	1	1	2	2	2	2	1	1
110	1	1	2	0	1	2	1	2	1	0	1	1	1	2	0	1	0	1
111	2	2	0	2	1	1	1	2	1	1	1	1	1	2	2	2	1	1
112	1	1	0	2	2	1	2	1	1	2	1	1	2	2	2	2	1	1
113	2	2	0	1	2	2	2	1	1	1	1	2	2	2	2	1	0	1
114	2	2	0	0	2	1	2	2	1	1	1	1	2	2	2	1	0	1
115	2	2	0	2	1	1	2	2	1	1	1	2	2	2	2	2	0	1
116	2	2	0	2	2	2	2	2	0	1	1	1	2	2	1	1	0	1
117	1	1	0	2	1	2	2	2	1	1	1	1	2	2	2	2	1	1
118	2	2	0	2	2	1	9	1	1	1	1	1	1	2	1	0	0	1
119	1	1	0	2	2	2	0	2	1	1	1	1	0	2	1	2	0	1
120	2	2	0	2	2	1	9	2	1	1	1	1	1	2	1	2	0	1
121	0	0	0	0	0	0	1	2	0	1	0	1	1	0	0	0	0	0
122	1	1	0	0	1	1	1	2	1	0	1	2	1	1	1	1	0	1
123	0	0	0	9	0	0	1	2	0	1	0	0	1	0	0	0	0	0
124	0	0	0	0	0	0	2	2	0	1	0	0	2	1	0	0	0	0
125	0	0	0	9	0	2	2	2	0	1	0	1	2	1	1	2	1	1
126	0	0	0	0	1	1	2	2	1	1	1	1	2	1	0	0	0	1
127	0	0	0	0	1	1	2	2	1	1	1	1	2	0	0	0	0	0
128	0	0	0	9	0	1	2	0	0	0	0	0	2	0	0	0	0	0
129	1	1	2	9	1	1	2	1	0	2	0	1	2	1	1	2	1	1
130	0	0	0	0	0	0	2	0	0	2	0	0	2	0	0	0	0	0
131	0	0	1	9	1	1	2	1	1	1	1	1	2	1	1	0	1	1
132	0	0	0	9	1	0	2	2	0	0	0	0	2	0	0	0	0	0
133	1	1	1	9	1	2	2	2	1	1	1	1	2	1	1	1	1	1
134	1	1	0	9	0	0	2	2	0	1	0	1	2	0	0	0	0	0
135	1	1	1	9	1	0	2	2	1	1	1	1	2	1	0	2	0	1
136	0	0	0	9	0	0	2	2	0	0	0	0	2	0	0	0	0	0

5. Indices of Intended Coverage

POPULATION A

5.1 Content Totals

System	000	400	100	300	200	MEANS
NZE	.93	1.00	1.00	1.00	.92	.96
SCO	1.00	1.00	.93	1.00	.92	.96
JPN	.95	1.00	.95	.78	.90	.93
ENW	.98	1.00	.88	.83	.85	.91
HUN	.93	1.00	.93	.83	.88	.91
CON	1.00	1.00	.69	.89	.88	.89
THA	.95	1.00	.71	.78	.73	.83
NTH	.89	.88	.88	.61	.75	.82
USA	1.00	1.00	.67	1.00	.57	.82
CBC	.97	.96	.83	.94	.49	.81
HKO	.97	.92	.75	.83	.67	.80
SWA	.87	.88	.78	.89	.65	.79
FIN	.80	.91	.75	.83	.71	.78
SWE	.87	.96	.72	1.00	.57	.78
IRE	.93	.92	1.00	.67	.38	.77
ISR	.91	1.00	.70	.00	.73	.73
FRA	.87	.65	.90	.28	.49	.70
BFL	.90	.69	.95	.17	.20	.64
BFR	.90	.69	.95	.17	.20	.64
LUX	.93	.79	.73	.22	.23	.60
MEAN	.92	.91	.83	.69	.64	.80
N. ITEMS	62	26	42	18	51	199

KEY:

000 = Arithmetic
100 = Algebra
200 = Geometry
300 = Statistics
400 = Measurement

5.1.1 000 Arithmetic
(No Items for 007)

System	001	006	003	005	004	001	009	008	MEANS
CON	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SCO	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
USA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENW	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.67	.98
CBC	1.00	1.00	1.00	.67	1.00	.90	1.00	1.00	.97
JPN	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.00	.95
THA	1.00	1.00	1.00	1.00	.94	.80	1.00	1.00	.95
HUN	1.00	.67	1.00	1.00	1.00	1.00	1.00	.33	.93
IRE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.00	.93
LUX	1.00	1.00	.90	1.00	.88	.90	1.00	1.00	.93
NZE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.00	.93
HKO	1.00	1.00	.80	1.00	1.00	.90	1.00	.67	.91
ISR	1.00	1.00	.90	.33	1.00	1.00	1.00	.67	.91
BFL	.92	1.00	1.00	1.00	.94	.80	1.00	.33	.90
BFR	.92	1.00	1.00	1.00	.94	.80	1.00	.33	.90
NTH	1.00	1.00	1.00	1.00	.75	.70	1.00	1.00	.89
SWA	1.00	1.00	.90	1.00	.88	.90	1.00	.00	.87
SWE	1.00	1.00	1.00	1.00	.88	.90	.00	.00	.87
FRA	1.00	1.00	.85	1.00	1.00	.70	.00	.33	.87
FIN	.88	1.00	.90	1.00	.50	1.00	1.00	.00	.80
MEAN	.99	.98	.96	.95	.94	.91	.90	.52	.92
N. ITEMS	12	3	13	3	17	10	1	3	62

KEY:

001 = Natural Numbers
002 = Common Fractions
003 = Decimal Fractions
004 = Ratio, Proportion, Percentage
005 = Number Theory
006 = Exponents
007 = Other Number Systems
008 = Square Roots
009 = Dimensional Analysis

5.1.2 100 Algebra
(No Items for 108, 109, 111, 112)

System	101	102	104	106	107	105	110	103	MEANS
IRE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NZE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
BFL	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.00	.95
BFR	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.00	.95
JPN	1.00	1.00	.89	1.00	1.00	1.00	1.00	.50	.95
HUN	1.00	1.00	1.00	1.00	1.00	1.00	.75	.00	.93
SCO	1.00	1.00	1.00	1.00	1.00	.67	1.00	.00	.93
FRA	1.00	1.00	1.00	1.00	1.00	1.00	.00	1.00	.90
ENW	.86	.50	1.00	.88	1.00	1.00	.75	1.00	.88
NTH	1.00	1.00	.88	.88	1.00	.67	1.00	.00	.88
CBC	.86	1.00	.89	.67	.75	.67	1.00	1.00	.83
SWA	.86	.75	.75	1.00	1.00	.67	.25	.50	.78
FIN	.71	1.00	.88	.75	1.00	.33	.50	.50	.75
HKO	1.00	.75	.88	.75	.75	1.00	.00	.50	.75
LUX	1.00	.75	.75	.63	.25	.67	1.00	.50	.73
SWE	1.00	1.00	.63	.86	.50	.67	.00	1.00	.72
THA	.86	1.00	.89	.89	.50	.67	.00	.00	.71
ISR	1.00	.75	.63	.88	1.00	.00	.00	1.00	.70
CON	1.00	.75	.63	.88	1.00	.00	.00	1.00	.70
USA	.43	1.00	.67	.56	1.00	.67	.75	.50	.67
MEAN	.92	.90	.88	.88	.88	.75	.61	.50	.83
N. ITEMS	7	4	9	9	4	3	4	2	42

KEY:

101 = Integers
102 = Rationals
103 = Integer Exponents
104 = Formulas
105 = Polynomials
106 = Equations and Inequations
107 = Relations and Functions
108 = Systems of Linear Equations
109 = Finite Systems
110 = Finite Sets
111 = Flowcharts and Programming
112 = Real Numbers

5.1.3 200 Geometry
(No Items for 210, 213, 214)

System	201	202	207	203	211	208	212	204	209	206	215	205	MEANS
NZE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.50	.25	1.00	.92
SCO	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.25	.00	.92
JPN	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.25	.00	.92
CON	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.67	.25	.00	.90
HUN	1.00	1.00	1.00	1.00	1.00	1.00	.50	1.00	1.00	.50	.25	.00	.88
ENW	1.00	1.00	1.00	.75	1.00	.75	.50	1.00	1.00	1.00	.25	.00	.85
NTH	1.00	.88	.86	1.00	1.00	1.00	1.00	.00	.75	1.00	.25	.00	.75
ISR	1.00	1.00	.86	1.00	.00	.75	.00	1.00	.25	1.00	.00	.00	.73
THA	.67	1.00	.71	1.00	1.00	.75	1.00	1.00	.00	1.00	.00	.00	.73
FIN	1.00	.88	1.00	.75	1.00	1.00	.50	.00	.75	.00	.25	1.00	.71
HKO	.83	1.00	1.00	1.00	.00	.75	.00	.80	.25	.00	.00	.00	.67
SWA	1.00	.88	1.00	.00	1.00	.75	.50	.20	1.00	.00	.25	.00	.65
SWE	.67	.50	.86	.75	.00	.50	1.00	.80	.50	.00	.00	.00	.57
USA	.83	.75	.57	.75	1.00	.25	1.00	.83	.00	.33	.00	.00	.57
CBC	.83	.63	.43	.50	1.00	.50	.67	.33	.00	.67	.25	.00	.49
FRA	.33	.63	.86	.75	.00	.50	.67	.00	.75	.00	.25	1.00	.49
IRE	1.00	.63	.14	.00	1.00	.25	.50	.20	.25	.00	.25	.00	.38
LUX	.50	.50	.29	.25	.00	.25	.00	.00	.00	.00	.00	.00	.23
BFL	.67	.13	.29	.00	.00	.00	.00	.00	.00	.00	.75	.00	.20
BFR	.67	.13	.29	.00	.00	.00	.00	.00	.00	.00	.75	.00	.20
MEAN	.85	.78	.74	.67	.65	.65	.59	.56	.52	.43	.22	.15	.64
N. ITEMS	6	8	7	4	1	4	3	6	4	3	4	1	51

KEY:

201 = Classification of plane figures
202 = Properties of plane figures
203 = Congruence of plane figures
204 = Similarity of plane figures
205 = Geometric constructions
206 = Pythagorean triangles
207 = Coordinates
208 = Simple deductions
209 = Informal transformations
210 = Relations in space
211 = Solids
212 = Spatial visualization
213 = Spatial orientation
214 = Decomposition of figures
215 = Transformational geometry

5.1.4 300 Statistics
(No Items for 305, 307, 308, 309)

System	304	302	303	301	306	MEANS
NZE	1.00	1.00	1.00	1.00	1.00	1.00
SCO	1.00	1.00	1.00	1.00	1.00	1.00
SWE	1.00	1.00	1.00	1.00	1.00	1.00
USA	1.00	1.00	1.00	1.00	1.00	1.00
CBC	1.00	1.00	1.00	.00	1.00	.95
CON	1.00	1.00	.86	1.00	.00	.89
SWA	1.00	1.00	1.00	.00	.00	.89
ENW	1.00	.67	.86	1.00	.00	.83
FIN	.83	1.00	1.00	.00	.00	.83
HKO	.83	1.00	.86	1.00	.00	.83
HUN	.83	1.00	1.00	.00	.00	.83
JPN	.83	1.00	.71	1.00	.00	.78
THA	.67	1.00	1.00	.00	.00	.78
IRE	.83	1.00	.57	.00	.00	.67
NTH	.67	.67	.43	1.00	1.00	.61
FRA	.17	.33	.29	1.00	.00	.28
LUX	.67	.00	.00	.00	.00	.22
BFL	.50	.00	.00	.00	.00	.17
BFR	.50	.00	.00	.00	.00	.17
ISR	.00	.00	.00	.00	.00	.00
MEAN	.77	.73	.68	.50	.30	.69
N. ITEMS	6	3	7	1	1	18

KEY:

301 = Data collection
302 = Organization of data
303 = Representation of data
304 = Interpretation of data
305 = Combinatorics
306 = Outcomes and events
307 = Counting of sets
308 = Mutually exclusive events
309 = Complementary events

5.1.5 400 Measurement

System	403	404	402	401	MEANS
CON	1.00	1.00	1.00	1.00	1.00
ENW	1.00	1.00	1.00	1.00	1.00
HUN	1.00	1.00	1.00	1.00	1.00
ISR	1.00	1.00	1.00	1.00	1.00
JPN	1.00	1.00	1.00	1.00	1.00
NZE	1.00	1.00	1.00	1.00	1.00
SCO	1.00	1.00	1.00	1.00	1.00
THA	1.00	1.00	1.00	1.00	1.00
USA	1.00	1.00	1.00	1.00	1.00
CBC	1.00	1.00	.83	1.00	.96
SWE	1.00	.90	1.00	1.00	.96
HKO	1.00	1.00	.83	.80	.92
IRE	1.00	.90	.83	1.00	.92
FIN	1.00	1.00	.67	1.00	.91
NTH	1.00	1.00	1.00	.40	.88
SWA	1.00	.70	1.00	1.00	.88
LUX	1.00	1.00	.50	.60	.79
BFL	.67	.67	.83	.60	.69
BFR	.67	.67	.83	.60	.69
FRA	.67	.92	.50	.20	.65
MEAN	.95	.94	.89	.86	.91
N. ITEMS	3	12	6	5	26

KEY:

401 = Standard units
402 = Estimation
403 = Approximation
404 = Areas, volumes, etc.

POPULATION B

5.2 Content Totals

System	300	100	500	200	600	400	700	MEANS
HKO	1.00	1.00	.98	.95	.86	.93	1.00	.96
NZE	1.00	1.00	1.00	.95	1.00	.75	1.00	.94
IRE	1.00	.86	.91	1.00	1.00	.86	1.00	.93
JPN	.92	.86	.98	.95	1.00	.82	1.00	.93
ENW	1.00	.71	.98	1.00	1.00	.75	.75	.92
FRA	.92	1.00	.91	.95	1.00	.89	1.00	.92
LUX	.92	1.00	.91	.95	.86	.89	1.00	.92
FIN	.96	1.00	.96	.95	1.00	.71	1.00	.91
BFL	1.00	1.00	.96	.95	.29	.68	.75	.87
BFR	1.00	1.00	.96	.95	.29	.68	.75	.87
ISR	.96	1.00	.98	1.00	.86	.61	.00	.87
CON	1.00	1.00	.83	.76	1.00	.77	1.00	.86
USA	.88	.86	.96	.84	.86	.68	.50	.85
SCO	1.00	1.00	.91	.79	.43	.61	1.00	.83
SWE	.92	.71	.89	.84	.86	.64	.75	.82
HUN	.92	.71	.96	.63	.29	.71	.00	.78
THA	.86	1.00	.63	.63	.57	.59	.00	.66
CBC	.84	1.00	.39	.84	.14	.50	.25	.57
MEAN	.95	.93	.89	.89	.74	.73	.71	.86
N. ITEMS	25	7	46	46	7	28	4	136

KEY:

100 = Sets and Relations
200 = Number Systems
300 = Algebra
400 = Geometry
500 = Elementary Functions and Calculus
600 = Probability and Statistics
700 = Finite Mathematics

5.2.1 100 Sets and Relations
(No Items for 101, 103, 105)

System	102	104	MEANS
BFL	1.00	1.00	1.00
BFR	1.00	1.00	1.00
CBC	1.00	1.00	1.00
CON	1.00	1.00	1.00
FIN	1.00	1.00	1.00
FRA	1.00	1.00	1.00
HKO	1.00	1.00	1.00
ISR	1.00	1.00	1.00
LUX	1.00	1.00	1.00
NZE	1.00	1.00	1.00
SCO	1.00	1.00	1.00
THA	1.00	1.00	1.00
IRE	1.00	.80	.86
JPN	1.00	.80	.86
USA	1.00	.80	.86
ENW	1.00	.60	.71
HUN	.00	1.00	.71
SWE	1.00	.60	.71
MEAN	.94	.92	.93
N. ITEMS	2	5	7

KEY:
101 = Set Notation
102 = Set Operations
103 = Relations
104 = Functions
105 = Infinite Sets

5.2.2 200 Number Systems

System	204	203	205	201	202	MEANS
ENW	1.00	1.00	1.00	1.00	1.00	1.00
IRE	1.00	1.00	1.00	1.00	1.00	1.00
ISR	1.00	1.00	1.00	1.00	1.00	1.00
BFL	1.00	1.00	1.00	1.00	.75	.95
BFR	1.00	1.00	1.00	1.00	.75	.95
FIN	1.00	1.00	.83	1.00	1.00	.95
FRA	1.00	1.00	1.00	.67	1.00	.95
HKO	1.00	1.00	1.00	.67	1.00	.95
JPN	1.00	1.00	1.00	.67	1.00	.95
LUX	1.00	1.00	1.00	.67	1.00	.95
NZE	1.00	1.00	1.00	1.00	.75	.95
USA	1.00	.67	.80	1.00	1.00	.88
CBC	1.00	1.00	.83	1.00	.50	.84
SWE	1.00	1.00	1.00	.67	.50	.84
SCO	1.00	1.00	.50	1.00	.75	.79
CON	1.00	.67	1.00	.67	.50	.76
HUN	1.00	1.00	.17	.33	1.00	.63
THA	1.00	1.00	.40	.50	.33	.63
MEAN	1.00	.96	.86	.82	.82	.89
N. ITEMS	3	3	6	3	4	19

KEY:

201 = Common Laws for Number Systems
202 = Natural Numbers
203 = Decimals
204 = Real Numbers
205 = Complex Numbers

5.2.3 300 Algebra
(No Items for 307)

System	302	301	303	305	304	306	MEANS
BFL	1.00	1.00	1.00	1.00	1.00	1.00	1.00
BFR	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CON	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENW	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HKO	1.00	1.00	1.00	1.00	1.00	1.00	1.00
IRE	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NZE	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SCO	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FIN	1.00	1.00	1.00	1.00	1.00	.00	.96
ISR	1.00	1.00	1.00	1.00	1.00	.00	.96
FRA	1.00	1.00	1.00	1.00	.67	1.00	.92
HUN	1.00	.83	1.00	1.00	1.00	.00	.92
JPN	1.00	1.00	1.00	.80	.83	1.00	.92
LUX	1.00	1.00	1.00	1.00	.67	1.00	.92
SWE	1.00	1.00	.80	1.00	1.00	.00	.92
USA	1.00	1.00	.80	.80	.80	1.00	.88
THA	1.00	.75	1.00	.80	.80	1.00	.86
CBC	1.00	.83	.80	.80	.83	1.00	.84
MEAN	1.00	.97	.97	.96	.92	.78	.95
N. ITEMS	2	6	5	5	6	1	25

KEY:

301 = Polynomials
302 = Quotients of Polynomials
303 = Roots and Radicals
304 = Equations and Inequalities
305 = Systems of Equations and Inequalities
306 = Matrices
307 = Groups, Rings, and Fields

5.2.4 400 Geometry
(No Items for 402, 404, 407, 408)

System	406	401	403	405	409	MEANS
HKO	1.00	1.00	1.00	1.00	.60	.93
FRA	.71	1.00	.89	1.00	1.00	.89
LUX	.71	1.00	.89	1.00	1.00	.89
IRE	1.00	1.00	.89	.83	.60	.86
JPN	1.00	1.00	1.00	.83	.20	.82
CON	.86	1.00	.71	1.00	.00	.81
ENW	1.00	1.00	.89	.67	.20	.75
NZE	1.00	1.00	.89	.83	.00	.75
FIN	1.00	.00	.89	.67	.20	.71
HUN	1.00	1.00	.89	.67	.00	.71
USA	1.00	1.00	.78	.67	.00	.68
BFL	.86	1.00	.78	.67	.20	.68
BFR	.86	1.00	.78	.67	.20	.68
SWE	.86	1.00	.67	.83	.00	.64
ISR	1.00	1.00	.89	.17	.00	.61
SCO	.71	1.00	.78	.67	.00	.61
THA	.80	.00	.88	.67	.00	.59
CBC	.86	1.00	.67	.17	.00	.50
MEAN	.90	.89	.84	.72	.24	.73
N. ITEMS	7	1	9	6	5	28

KEY:

401 = Euclidean Geometry
402 = Affine/Projective Geometry
403 = Analytic Geometry
404 = 3-Dimensional Geometry
405 = Vector Methods
406 = Trigonometry
407 = Finite Geometry
408 = Elements of Topology
409 = Transformational Geometry

5.2.5 500 Elementary Functions and Calculus
(No Items for 509, 510)

System	501	502	504	503	508	506	505	507	MEANS
NZE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ENW	1.00	1.00	1.00	1.00	1.00	1.00	.90	1.00	.98
HKO	.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.98
ISR	1.00	1.00	1.00	1.00	1.00	1.00	.90	1.00	.98
JPN	1.00	1.00	1.00	1.00	1.00	1.00	.90	1.00	.98
BFL	1.00	1.00	1.00	1.00	1.00	1.00	.80	1.00	.96
BFR	1.00	1.00	1.00	1.00	1.00	1.00	.80	1.00	.96
FIN	1.00	1.00	1.00	1.00	1.00	1.00	.80	1.00	.96
HUN	1.00	1.00	1.00	1.00	1.00	.86	.90	1.00	.96
USA	.91	1.00	1.00	1.00	1.00	1.00	.90	1.00	.96
FRA	1.00	1.00	1.00	1.00	1.00	1.00	.70	.50	.91
IRE	.82	1.00	1.00	.75	1.00	1.00	.90	1.00	.91
LUX	1.00	1.00	1.00	1.00	1.00	1.00	.70	.50	.91
SCO	.91	1.00	1.00	.75	1.00	1.00	.90	.50	.91
SWE	.91	1.00	.75	1.00	1.00	1.00	.80	.50	.89
CON	.91	.75	1.00	.50	1.00	.83	.70	1.00	.83
THA	1.00	1.00	1.00	1.00	.00	.00	.75	.00	.63
CBC	.91	.75	.00	.50	.20	.00	.20	.00	.39
MEAN	.96	.97	.93	.92	.90	.87	.81	.78	.89
N. ITEMS	11	4	4	4	5	6	10	2	46

KEY:

501 = Elementary Functions
502 = Properties
503 = Limits/Continuity
504 = Differentiation
505 = Applications of the Derivative
506 = Integration
507 = Techniques of Integration
508 = Applications of Integration
509 = Differential Equations
510 = Sequences/Series of Functions

5.2.6 600 Probability and Statistics
(No Items for 604, 605)

System	601	602	603	MEANS
CON	1.00	1.00	1.00	1.00
ENW	1.00	1.00	1.00	1.00
FIN	1.00	1.00	1.00	1.00
IRE	1.00	1.00	1.00	1.00
JPN	1.00	1.00	1.00	1.00
NZE	1.00	1.00	1.00	1.00
FRA	1.00	1.00	.00	.86
HKO	1.00	.67	1.00	.86
ISR	1.00	1.00	.00	.86
LUX	1.00	1.00	.00	.86
SWE	1.00	.67	1.00	.86
USA	.67	1.00	1.00	.86
THA	.67	.67	.00	.57
SCO	.33	.67	.00	.43
BFL	.67	.00	.00	.29
BFR	.67	.00	.00	.29
HUN	.00	.67	.00	.29
CBC	.00	.33	.00	.14
MEAN	.78	.76	.50	.73
N. ITEMS	3	3	1	7

KEY:
601 = Probability
602 = Statistics
603 = Distributions
604 = Statistical Inference
605 = Bivariate Statistics

5.2.7 700 Finite Mathematics

System	701	MEANS
CON	1.00	1.00
FIN	1.00	1.00
FRA	1.00	1.00
HKO	1.00	1.00
IRE	1.00	1.00
JPN	1.00	1.00
LUX	1.00	1.00
NZE	1.00	1.00
SCO	1.00	1.00
BFL	.75	.75
BFR	.75	.75
ENW	.75	.75
SWE	.75	.75
USA	.50	.50
CBC	.25	.25
HUN	.00	.00
ISR	.00	.00
THA	.00	.00
MEAN	.71	.71
N. ITEMS	4	4

KEY:
701 = Combinatorics

6. Teacher Opportunity-to-Learn Ratings Tables

6.1 POPULATION A

Teacher Opportunity-to-Learn Ratings Table

ID	BFL	CBC	CON	ENW	FIN	FRA	HUN	ISR	JPN	LUX	NTH	NZE	NGE	SWA	SWE	THA	USA
001	97	100	100	93	100	99	99	87	100	90	96	94	88	95	80	97	98
002	32	27	43	44	30	23	75	24	44	19	38	42	46	83	26	34	29
003	96	99	100	96	99	100	100	79	100	93	98	96	82	100	77	100	100
004	94	99	100	96	99	99	100	81	99	93	99	96	88	100	86	100	100
005	89	99	99	94	100	99	100	77	98	96	98	92	97	100	99	99	100
006	95	88	90	83	92	85	100	81	97	91	93	82	84	94	92	90	87
007	83	96	99	93	93	92	97	80	93	91	96	94	63	100	94	90	95
008	62	84	93	71	65	93	100	67	98	63	69	37	89	77	41	99	92
009	87	88	91	81	61	91	100	83	99	81	88	58	79	73	81	89	91
010	93	98	98	86	96	99	97	89	99	91	87	88	97	94	27	94	93
011	07	57	66	56	04	08	42	45	01	57	67	21	94	43	04	38	57
012	90	100	89	84	100	100	99	94	99	65	93	93	96	84	52	100	93
013	90	96	94	85	90	98	100	93	99	78	94	91	74	88	90	81	91
014	32	94	79	85	99	90	98	88	100	65	100	93	82	100	95	95	84
015	75	69	64	84	91	97	99	87	81	65	91	78	88	89	50	71	49
016	66	58	27	45	54	59	100	75	97	17	50	27	76	86	25	81	35
017	83	93	89	77	83	97	97	84	94	65	87	82	86	100	44	98	88
018	58	91	78	73	49	63	100	84	100	68	92	53	87	94	63	92	71
019	94	83	38	42	37	78	99	54	79	32	31	29	45	87	16	39	43
020	..	..	..	64	83	..	51	73	86	78	92	..	43	95	27	..	..
021	71	76	73	69	41	82	100	61	20	66	92	78	87	89	55	92	74
022	21	71	75	75	54	39	100	61	59	63	85	94	88	100	58	85	61
023	17	13	26	27	32	61	98	32	93	35	23	16	45	71	16	27	23
024	14	75	57	44	32	37	100	45	36	15	79	66	48	70	60	88	55
025	11	73	68	47	32	18	100	45	30	35	63	57	68	75	64	80	55
026	44	57	70	46	21	29	100	49	50	59	26	27	68	50	16	54	62
027	08	76	48	54	03	04	43	44	02	28	62	27	56	20	06	41	55
028	12	78	57	82	84	62	100	82	95	38	97	91	76	100	63	59	65
029	02	56	34	46	63	42	94	64	84	26	81	58	48	100	46	36	37
030	27	26	38	62	46	87	100	25	59	10	92	96	53	100	11	25	25
031	84	28	30	60	23	66	92	49	93	53	82	41	50	100	22	36	26
032	28	52	66	89	58	45	99	67	92	39	39	70	62	91	66	55	78
033	60	59	77	80	74	66	99	53	100	35	43	73	77	100	54	73	81
034	29	..	71	85	56	38	99	63	95	23	36	77	71	100	68	72	83
035	79	69	82	83	81	68	100	78	97	74	63	70	72	95	53	20	88
036	57	70	74	56	71	47	78	58	92	49	73	76	67	91	69	55	62
037	86	80	78	82	53	96	99	71	99	94	75	73	79	95	67	90	70
038	84	87	90	86	83	95	99	71	99	68	79	68	74	94	91	87	86
039	89	70	89	86	61	98	99	64	100	88	87	66	77	87	39	96	82
040	82	65	64	68	32	96	100	69	99	93	69	59	62	100	55	97	65
041	100	97	100	97	97	98	99	62	99	98	100	99	91	95	97	98	100
042	96	94	97	89	94	99	100	68	99	98	97	88	84	100	91	91	90
043	87	95	81	76	95	92	100	88	97	64	94	86	58	96	84	99	84
044	95	98	98	95	96	94	100	82	100	97	95	87	79	90	84	99	92
045	98	92	91	70	95	96	99	75	89	72	85	47	100	94	89	88	90
046	91	93	96	85	80	97	100	93	100	88	93	68	95	77	97	96	97
047	88	86	90	71	42	98	100	57	89	52	55	41	78	60	30	98	92

ID	BFL	CBC	CON	ENW	FIN	FRA	HUN	ISR	JPN	LUX	NTH	NZE	NGE	SWA	SWE	THA	USA
048	78	97	68	63	84	99	51	59	57	71	77	48	78	73	30	66	75
049	88	99	89	82	97	99	100	91	100	68	88	88	94	81	45	99	87
050	..	..	..	68	60	..	88	78	98	73	81	..	84	89	69	..	..
051	..	..	..	67	98	..	99	85	100	54	87	..	89	86	44	..	..
052	59	80	68	49	50	60	99	83	98	29	52	42	62	93	35	70	60
053	82	91	93	77	82	91	100	88	95	55	80	71	88	93	44	88	73
054	80	87	68	52	47	95	100	83	86	36	78	64	71	85	26	86	69
055	32	64	36	42	45	73	97	66	58	21	38	44	63	94	10	26	37
056	..	..	..	59	86	..	56	69	83	79	92	..	56	73	42	..	..
057	76	73	84	82	54	90	99	68	93	88	76	76	86	94	64	95	70
058	14	69	70	66	54	22	97	48	39	57	83	87	83	94	52	76	60
059	13	63	69	65	41	26	100	49	52	36	73	72	81	100	38	67	43
060	..	..	..	44	35	..	100	17	06	26	25	..	76	86	18	..	..
061	..	..	..	52	57	..	73	61	71	48	78	..	47	100	23	..	..
062	20	49	60	68	37	31	100	43	61	47	82	68	80	94	52	71	44
063	06	11	24	36	31	23	99	09	30	03	70	70	40	83	06	17	10
064	..	..	..	87	56	..	100	58	98	93	87	..	74	100	41	..	..
065	22	18	36	39	21	09	36	24	45	13	23	38	41	80	25	34	33
066	20	47	53	58	33	64	100	59	93	53	40	33	81	77	56	63	62
067	65	82	96	84	80	85	99	77	96	88	45	70	89	90	56	62	95
068	85	95	98	86	89	99	99	72	99	90	98	93	88	95	92	90	89
069	78	91	91	80	89	96	97	69	96	71	88	76	70	100	84	74	84
070	92	70	83	68	40	94	100	70	98	93	66	63	77	100	46	96	83
071	81	73	66	76	51	99	97	59	96	86	76	64	65	94	56	77	57
072	87	69	88	77	60	95	96	62	98	95	75	56	89	85	46	98	80
073	98	96	100	99	100	99	99	65	100	98	99	94	77	100	99	99	100
074	48	26	29	42	44	34	47	27	21	20	24	29	62	79	24	25	20
075	94	95	92	95	93	98	100	67	100	91	94	96	77	100	90	95	88
076	96	89	93	89	96	99	99	65	99	96	93	81	81	89	83	86	85
077	75	85	75	80	87	91	100	74	98	76	82	63	93	88	96	88	81
078	49	78	85	68	42	93	97	78	100	79	65	36	74	79	73	97	83
079	59	81	94	65	41	86	100	63	98	67	61	41	59	60	39	97	90
080	94	96	99	92	47	100	95	75	99	95	90	98	59	100	55	89	96
081	08	66	76	59	09	08	40	51	00	59	67	35	79	63	02	49	59
082	83	98	91	57	92	97	99	82	95	70	96	90	49	100	90	95	83
083	..	..	..	53	79	..	91	76	89	49	67	..	71	85	34	..	..
084	20	59	56	47	37	63	21	53	15	21	37	18	58	33	28	71	73
085	86	87	90	74	85	95	100	90	100	64	88	76	83	83	63	99	83
086	89	94	89	77	81	93	100	83	99	61	81	77	74	94	66	100	79
087	83	82	89	72	81	88	95	71	100	85	86	65	84	94	82	87	79
088	84	46	47	45	69	99	99	78	88	41	63	56	76	87	18	97	38
089	97	..	83	86	64	91	100	59	71	88	97	86	68	100	71	98	83
090	25	44	51	57	36	43	99	33	70	18	85	94	69	95	20	60	34
091	15	80	73	46	47	45	99	62	47	28	79	71	83	92	83	88	77
092	..	..	..	44	24	..	98	13	03	08	21	..	46	60	07	..	..
093	03	75	42	57	03	05	44	43	01	24	60	31	82	55	04	37	54
094	..	..	..	43	36	..	86	29	40	27	70	..	45	88	21	..	..
095	..	..	..	84	62	..	100	59	100	63	78	..	77	90	68	..	..
096	22	14	27	31	32	16	100	21	23	05	69	32	77	92	04	39	15
097	43	48	57	66	54	72	94	34	44	24	22	72	56	76	39	42	74
098	13	39	39	65	47	35	69	35	43	80	17	73	64	79	32	48	65
099	44	50	72	69	52	46	99	52	80	16	21	64	52	83	41	49	72

ID	BFL	CBC	CON	ENW	FIN	FRA	HUN	ISR	JPN	LUX	NTH	NZE	NGE	SWA	SWE	THA	USA
100	91	86	90	90	96	99	99	68	98	98	98	77	96	100	97	86	77
101	97	91	98	96	99	99	99	69	99	98	99	92	67	100	98	97	82
102	65	89	87	91	69	78	99	65	96	83	95	95	54	100	86	84	77
103	82	78	88	90	66	95	99	73	100	99	88	79	88	100	77	97	79
104	95	63	78	78	53	100	99	61	99	96	80	54	70	73	35	89	67
105	91	93	93	73	97	99	99	88	98	75	92	81	81	100	55	94	90
106	75	77	78	67	68	63	100	81	96	71	79	44	80	73	65	90	63
107	97	100	100	96	97	99	100	74	100	97	99	89	91	100	82	99	100
108	86	..	100	88	100	100	100	66	98	97	96	79	75	100	97	96	100
109	74	98	99	97	99	98	99	68	100	98	98	96	75	100	99	97	98
110	88	94	95	77	71	94	100	85	100	83	74	58	100	88	88	97	92
111	93	93	96	82	95	99	100	94	99	81	92	86	78	91	49	98	87
112	77	..	94	56	79	97	80	74	78	70	55	36	94	60	28	96	86
113	94	99	93	86	97	99	100	93	100	77	90	95	98	95	53	99	93
114	..	..	..	27	28	..	92	73	20	25	62	..	36	87	30	..	..
115	87	95	88	80	94	97	100	93	100	62	88	90	100	89	44	99	83
116	81	89	79	74	85	94	99	84	90	57	75	76	93	100	32	93	65
117	67	85	78	58	54	73	97	82	98	28	60	46	71	94	28	95	62
118	68	81	63	38	27	66	82	77	21	13	65	48	48	75	42	98	54
119	..	..	..	82	84	..	100	86	92	66	84	..	96	100	55	..	..
120	91	58	38	48	78	93	48	66	55	77	63	81	38	75	18	12	45
121	88	79	92	95	69	93	99	69	83	88	97	94	90	100	89	96	86
122	83	84	84	93	47	17	100	68	94	68	91	98	90	100	82	88	82
123	25	61	74	82	32	28	100	56	63	33	75	78	96	100	45	81	57
124	..	..	..	39	23	..	99	38	19	13	61	..	63	73	37	..	..
125	08	53	39	39	22	04	100	21	03	11	16	35	70	79	12	64	46
126	07	70	47	65	57	48	90	71	58	32	83	68	60	100	48	43	49
127	13	..	59	39	29	16	100	34	21	18	66	58	67	75	32	67	38
128	19	74	74	81	53	42	98	60	66	63	84	91	88	95	60	84	54
129	14	17	36	57	24	39	98	26	96	13	14	43	69	94	10	54	29
130	32	53	63	83	62	46	100	63	97	26	33	71	54	91	65	65	83
131	50	38	54	49	47	71	60	34	37	13	17	63	51	88	24	48	66
132	89	89	99	85	89	83	97	71	93	84	66	77	90	88	77	83	97
133	98	85	98	93	97	98	99	70	100	99	98	86	85	100	97	95	79
134	67	62	69	74	63	82	87	46	83	22	65	71	52	90	51	65	48
135	50	86	91	75	96	75	99	56	71	38	86	56	60	100	91	82	75
136	99	52	77	73	67	88	100	57	100	97	88	56	81	83	45	95	73
137	91	93	83	73	91	96	95	77	57	73	89	82	78	89	77	88	83
138	80	84	86	88	84	86	91	74	74	75	89	80	73	83	86	72	88
139	97	95	98	76	96	99	95	78	36	69	89	68	65	94	38	94	100
140	86	99	99	90	100	99	100	76	100	98	97	90	78	95	90	99	99
141	51	72	78	53	50	90	99	70	95	78	63	45	70	70	75	89	72
142	27	71	67	33	27	93	100	53	96	58	34	18	61	80	06	63	62
143	77	87	64	77	59	93	99	68	97	90	77	50	74	85	73	91	89
144	65	54	57	63	55	90	94	47	97	75	66	50	63	75	55	53	46
145	11	75	79	64	08	17	37	48	00	73	73	36	73	20	02	40	62
146	83	88	93	92	93	87	100	74	99	93	97	85	80	100	93	82	88
147	..	..	..	73	96	..	100	90	100	73	87	..	78	80	39	..	..
148	81	81	54	49	74	99	87	76	58	50	76	53	67	88	24	94	65
149	85	72	42	55	58	92	100	78	97	33	64	37	62	91	30	94	44
150	..	..	..	60	68	..	92	75	84	39	76	..	59	86	10	..	..
151	87	79	66	66	48	88	99	78	99	60	83	51	54	82	50	93	56

ID	BFL	CBC	CON	ENW	FIN	FRA	HUN	ISR	JPN	LUX	NTH	NZE	NGE	SWA	SWE	THA	USA
152	44	81	62	66	55	93	99	70	92	50	46	64	53	88	47	62	75
153	..	..	..	59	72	..	74	68	91	83	76	..	69	63	71	..	..
154	..	..	..	62	19	..	99	27	49	05	81	..	50	100	06	..	..
155	20	62	53	71	34	45	97	59	83	49	66	87	63	80	36	76	45
156	81	37	47	43	25	75	100	18	05	17	17	27	59	82	08	54	49
157	..	..	..	49	31	..	100	20	50	13	88	..	50	100	04	..	..
158	03	20	27	40	32	05	97	16	44	02	68	74	40	94	05	42	17
159	39	21	18	29	24	40	58	15	70	16	44	20	26	67	15	45	17
160	18	43	47	62	44	45	93	63	85	31	30	33	42	70	59	56	68
161	19	36	42	58	43	46	93	62	83	32	29	29	58	78	55	55	66
162	34	53	69	85	52	45	98	55	74	17	25	71	55	90	55	63	80
163	34	20	30	40	05	10	31	18	06	06	17	45	63	20	07	13	40
164	84	91	96	93	93	95	99	62	98	91	97	90	68	94	96	86	92
165	98	83	96	86	81	95	100	73	91	88	87	72	64	95	86	92	92
166	87	54	76	71	55	98	100	53	98	94	76	52	71	75	35	89	62
167	81	68	80	80	65	94	94	49	91	43	77	72	39	90	62	67	71
168	78	42	55	53	51	95	99	50	75	85	65	33	58	73	27	83	55
169	03	75	56	73	75	54	100	73	90	33	92	84	52	94	57	41	59
170	11	00	01	13	03	53	02	02	01	03	07	11	52	20	02	08	02
171	72	05	01	09	08	07	00	05	00	07	04	05	69	00	02	15	03
172	54	88	58	42	48	80	32	57	06	21	33	32	57	75	20	55	67
173	26	12	58	14	05	16	00	03	03	07	07	11	25	00	04	10	02
174	07	22	30	48	34	90	95	16	53	11	72	84	25	95	11	18	20
175	88	72	63	54	69	79	95	66	88	45	91	71	42	100	67	84	56
176	17	11	13	16	30	79	84	15	67	25	34	18	62	50	15	30	06
177	87	92	97	..	..	97	..	..	..	..	..	67	..	..	..	100	95
178	90	96	98	..	..	97	..	..	..	..	..	72	..	..	..	99	99
179	87	94	95	..	..	92	..	..	..	..	..	68	..	..	..	99	96
180	49	84	85	..	..	70	..	..	..	..	..	34	..	..	..	99	72
181	56	82	86	..	..	84	..	..	..	..	..	60	..	..	..	95	83
182	99	99	99	..	..	98	..	..	..	..	..	92	..	..	..	97	100
183	71	96	100	..	..	88	..	..	..	..	..	60	..	..	..	91	100
184	82	80	77	..	..	93	..	..	..	..	..	72	..	..	..	91	84
185	91	88	96	..	..	85	..	..	..	..	..	76	..	..	..	85	93
186	97	96	100	..	..	99	..	..	..	..	..	99	..	..	..	98	99
187	96	94	98	..	..	100	..	..	..	..	..	94	..	..	..	97	100
188	93	97	100	..	..	90	..	..	..	..	..	96	..	..	..	96	98
189	94	96	99	..	..	94	..	..	..	..	..	83	..	..	..	99	98
190	85	86	95	..	..	95	..	..	..	..	..	59	..	..	..	96	92
191	87	87	90	..	..	97	..	..	..	..	..	46	..	..	..	95	83
192	70	77	82	..	..	93	..	..	..	..	..	47	..	..	..	97	77
193	25	70	35	..	..	10	..	..	..	..	..	27	..	..	..	57	35
194	58	76	75	..	..	78	..	..	..	..	..	71	..	..	..	81	68
195	77	85	82	..	..	83	..	..	..	..	..	48	..	..	..	95	61
196	49	84	88	..	..	55	..	..	..	..	..	54	..	..	..	98	67
197	21	41	47	..	..	16	..	..	..	..	..	18	..	..	..	41	48
198	71	35	33	..	..	89	..	..	..	..	..	44	..	..	..	46	21
199	42	39	48	..	..	76	..	..	..	..	..	17	..	..	..	52	38

6.2 POPULATION B

Teacher Opportunity-to-Learn Ratings Table

ID	BFL	CBC	CON	ENW	FIN	HUN	ISR	JPN	NZE	SWE	THA	USA
001	.98	.74	.94	.64	.92	.10	.24	.99	.91	.51	.91	.91
002	.98	.99	.99	.96	1.00	1.00	.67	1.00	.99	.99	.81	1.00
003	.93	.51	.49	.57	.76	.50	.40	.97	.89	.33	.83	.71
004	.99	.99	1.00	.99	.99	1.00	.96	1.00	1.00	1.00	.96	1.00
005	.98	.90	.97	.90	.98	.91	.72	1.00	.98	.97	.82	.95
006	.97	.87	.99	.98	1.00	.99	.91	1.00	1.00	.99	.85	.99
007	.81	.83	.80	.83	.88	.93	.73	1.00	.71	.94	.60	.83
008	.97	.68	.72	.57	1.00	.73	.47	1.00	.70	.89	.40	.77
009	.99	.94	1.00	.97	.99	.96	.86	1.00	1.00	.98	.91	.99
010	.98	.92	.97	.95	.98	1.00	.99	1.00	.96	1.00	.91	.98
011	.75	.23	.57	.54	.91	.62	.45	.99	.26	.49	.73	.54
012	.99	.96	1.00	.97	.98	.97	.99	1.00	1.00	.99	.90	.99
013	.96	.55	.95	.92	.96	.86	.94	1.00	.90	.99	.32	.81
014	.99	.15	1.00	.96	.92	.30	1.00	.97	1.00	1.00	.90	.53
015	.98	.06	.98	.96	.93	.88	.84	.98	1.00	.98	.95	.38
016	.79	.48	.59	.36	.59	.18	.27	.97	.56	.34	.71	.67
017	.77	.73	.86	.76	.92	.80	.61	1.00	.88	.84	.77	.91
018	.78	.44	.65	.63	.86	.09	.48	.41	.85	.95	.76	.72
019	.99	.91	1.00	.93	1.00	.87	.54	1.00	1.00	.89	.78	.98
020	.97	.12	.80	.62	.07	.01	.03	.99	.93	.08	.71	.46
021	.93	.50	.76	.84	.98	.91	.78	1.00	.91	.90	.54	.65
022	.93	.50	.98	.75	1.00	.89	.26	1.00	.77	.91	.85	.71
023	.97	.96	.99	.97	.96	.98	.99	.99	.99	1.00	.86	.96
024	.88	.25	.61	.72	.86	.88	.71	.93	.68	.96	.33	.48
025	.99	.96	1.00	.98	.98	1.00	.99	1.00	1.00	.99	.93	.99
026	.98	.98	.97	.98	.97	.97	.99	1.00	.99	.70	.95	.91
027	.99	.37	.95	.90	.93	.81	.90	.84	.95	.83	.58	.79
028	.94	.17	.99	.92	.91	.59	.81	.90	.99	.61	.82	.63
029	.94	.05	.93	.96	.94	.96	.75	1.00	.99	1.00	.24	.34
030	.57	.09	.81	.79	.87	.04	.31	.98	.92	.90	.93	.42
031	.92	.78	.95	.75	.99	.13	.25	.99	.97	.65	.92	.95
032	.89	.96	.96	.95	.98	.87	.65	.87	1.00	1.00	.53	.93
033	.47	.45	.91	.50	.93	.77	.88	.98	.93	.73	.81	.70
034	.76	.58	.65	.69	.94	.09	.35	.14	.83	1.00	.59	.53
035	.99	.97	1.00	.95	1.00	1.00	.92	1.00	.99	.98	.93	.99
036	.99	.99	.99	.83	.99	.98	.96	.99	.99	.99	.91	.99
037	.99	.98	1.00	.98	1.00	.99	.68	1.00	.99	.99	.82	.99
038	.81	.53	.86	.65	.84	.99	.57	1.00	.68	.90	.84	.75
039	.99	.95	1.00	.97	.98	1.00	.99	.99	1.00	.97	.92	.97
040	.97	.25	.98	.73	1.00	.96	.05	1.00	.71	.86	.89	.48
041	.99	.67	.99	.95	.99	.98	.93	.96	.98	.94	.81	.92
042	.98	.79	.98	.66	.94	.26	.79	1.00	1.00	.74	.92	.96
043	.96	.65	.93	.97	.96	.78	.89	.98	1.00	1.00	.68	.81
044	.90	.05	.93	.91	.92	.88	.69	.96	.96	1.00	.31	.34
045	.57	.07	.86	.76	.86	.06	.23	.99	.68	.91	.94	.44
046	.98	.97	.98	.63	1.00	.93	.73	1.00	1.00	.99	.95	.98
047	.95	.95	.98	.96	.96	.94	.98	1.00	.97	.99	.94	.88

ID	BFL	CBC	CON	ENW	FIN	HUN	ISR	JPN	NZE	SWE	THA	USA
048	.58	.84	.86	.92	.85	.94	.80	.98	.94	1.00	.84	.70
049	.98	.98	1.00	.94	.99	.99	.87	1.00	.97	.99	.92	1.00
050	.67	.43	.56	.59	.71	.62	.66	.99	.68	.91	.56	.59
051	.86	.92	.96	.92	.93	.96	.66	1.00	.94	.94	.76	.87
052	.98	.21	.90	.75	.94	.96	.05	.99	.98	.95	.94	.32
053	.58	.03	.62	.88	.94	.66	.25	.95	.73	.46	.28	.46
054	.98	.81	.93	.97	1.00	.97	.75	1.00	.95	1.00	.82	.88
055	.98	.59	.93	.95	.91	.86	.92	1.00	1.00	.99	.74	.82
056	.62	.72	.69	.74	.80	.19	.63	.79	.57	.99	.80	.46
057	.90	.20	.98	.94	.91	.53	.75	.89	.96	.91	.61	.56
058	.91	.07	.98	.96	.94	.93	.71	.98	.93	.99	.23	.38
059	.56	.81	.72	.84	.88	.82	.40	.97	.98	.91	.96	.93
060	.52	.73	.81	.94	.92	.79	.42	.99	.88	.93	.97	.81
061	.97	.86	.99	.32	.98	.56	.32	.75	1.00	.67	.73	.94
062	.89	1.00	.80	.74	.99	.10	.47	.99	.88	1.00	.87	.96
063	.95	.88	.73	.49	.91	.11	.50	.98	.91	.84	.85	.93
064	.59	.85	.92	.86	.82	.75	.51	.99	.90	.99	.74	.87
065	.92	.68	.81	.97	.98	.66	.69	1.00	1.00	.71	.42	.73
066	.98	1.00	1.00	.93	1.00	.90	.68	1.00	.99	.98	.88	1.00
067	.99	.97	1.00	.93	1.00	.97	.93	1.00	.99	.97	.89	.99
068	.96	.83	.88	.93	.96	1.00	.97	1.00	.90	.95	.78	.90
069	.92	.75	.89	.93	.99	.92	.72	1.00	.87	.95	.82	.89
070	.93	.93	.91	.87	.93	.97	.85	1.00	.91	.97	.86	.96
071	.63	.43	.41	.69	.60	.44	.62	.86	.42	.64	.38	.31
072	.99	.09	1.00	.96	.91	.29	.99	.90	1.00	.97	.93	.46
073	.82	.01	.78	.95	.60	.04	.28	.77	.96	.31	.29	.24
074	.32	.10	.45	.50	.79	.03	.26	.44	.88	.61	.92	.11
075	.14	.14	.42	.44	.77	.04	.21	.44	.94	.56	.85	.15
076	.74	.16	.48	.40	.70	.32	.39	.94	.51	.27	.68	.47
077	.92	.97	.95	.95	1.00	1.00	.98	1.00	.91	.97	.94	.92
078	.95	.95	.90	.90	.94	1.00	.54	1.00	.90	.89	.77	.99
079	.99	.90	.96	.96	.99	.96	.75	1.00	.99	.97	.83	.93
080	.98	.97	.97	.91	1.00	.99	.94	1.00	.92	.97	.89	.98
081	.99	.96	.99	.88	1.00	1.00	.97	.97	1.00	.98	.92	.99
082	.98	.98	1.00	.98	1.00	1.00	.74	1.00	1.00	1.00	.85	1.00
083	.99	.99	1.00	.99	.99	.97	.82	1.00	1.00	.99	.94	1.00
084	.98	.91	.95	.89	.94	.93	.97	1.00	.99	.97	.80	.97
085	.77	.92	.84	.80	.95	.87	.93	1.00	.82	.93	.86	.90
086	.51	.96	.94	.95	.94	.85	.94	.96	.99	.99	.94	.76
087	.99	.98	.98	.98	.98	.99	.99	1.00	1.00	.99	.93	.93
088	.63	.34	.99	.93	.47	.71	.44	.96	.96	.94	.92	.59
089	.43	.03	.78	.71	.84	.07	.26	.96	.76	.84	.83	.34
090	.65	.29	.83	.57	.73	.85	.63	.98	.62	.83	.84	.82
091	.97	.65	.84	.69	1.00	.81	.46	.99	1.00	.99	.66	.88
092	.91	.98	.84	.74	.99	.09	.50	.99	.90	1.00	.87	.98
093	.81	.10	.63	.65	.77	.07	.52	.06	.86	1.00	.41	.57
094	.47	.91	.84	.63	.78	.81	.64	.97	.81	.60	.47	.92
095	.71	.92	.97	.98	.95	.37	.56	.97	.98	.83	.92	.85
096	.99	1.00	.99	.97	.97	1.00	.98	1.00	1.00	.94	.97	.99
097	.75	.91	.85	.89	.82	1.00	.55	1.00	.86	.93	.72	.97
098	.93	.36	.98	.78	1.00	.96	.02	1.00	.88	.91	.88	.48

ID	BFL	CBC	CON	ENW	FIN	HUN	ISR	JPN	NZE	SWE	THA	USA
099	.94	.79	.95	.91	.97	.97	.72	.99	.96	.91	.56	1.00
100	.22	.02	.41	.42	.20	.08	.05	.35	.35	.28	.52	.15
101	.99	.16	.98	.76	.95	.75	1.00	.96	.96	.97	.95	.69
102	.99	.66	.90	.88	1.00	.85	.88	.92	.96	.93	.80	.94
103	.96	.04	.94	.97	.93	.96	.79	.99	1.00	1.00	.40	.37
104	.99	.28	.99	.94	.92	.96	.99	1.00	.99	.99	.95	.67
105	.60	.06	.97	.69	.88	.17	.57	.99	.56	.88	.94	.50
106	.98	.11	.91	.94	.93	.04	.94	.89	1.00	.96	.40	.39
107	.99	.04	.97	.95	.92	.32	.81	.84	1.00	.96	.87	.36
108	.98	.12	.98	.61	.92	.60	.97	.96	.91	.97	.93	.66
109	.85	.16	.98	.92	.93	.90	.84	1.00	.94	1.00	.79	.50
110	.97	.43	.84	.58	.92	.93	.82	.94	.94	.96	.81	.72
111	.88	.30	.91	.87	.94	.94	.91	.99	.85	.98	.81	.46
112	.99	.25	.96	.96	.92	.93	.97	1.00	.99	.98	.88	.66
113	.96	.07	.94	.96	.94	.82	.77	.83	1.00	1.00	.41	.37
114	.72	.04	.78	.77	.93	.17	.49	.80	.93	.70	.26	.28
115	.92	.06	.94	.95	.94	.94	.73	1.00	.97	.99	.09	.36
116	.95	.04	.93	.92	.93	.14	.51	.76	.97	.66	.31	.33
117	.97	.24	.98	.96	.92	.90	.95	1.00	.96	1.00	.93	.59
118	.62	.05	.80	.96	.41	.12	.31	.87	.98	.36	.46	.31
119	.95	.19	.99	.91	.92	.53	.97	.90	.98	.93	.58	.53
120	.91	.07	.97	.95	.94	.94	.71	.98	.94	.97	.35	.33
121	.61	.14	.58	.19	.37	.09	.02	.83	.40	.18	.46	.12
122	.65	.06	.64	.39	.85	.65	.70	.92	.90	.41	.36	.34
123	.24	.03	.27	.10	.09	.01	.06	.09	.41	.11	.40	.06
124	.39	.03	.27	.58	.28	.04	.11	.80	.75	.43	.33	.06
125	.62	.01	.99	.68	.85	.08	.50	.99	.52	.93	.93	.41
126	.35	.07	.45	.62	.73	.20	.06	.91	.41	.23	.39	.25
127	.22	.28	.45	.39	.50	.50	.85	.90	.46	.35	.79	.34
128	.88	.00	.35	.22	.21	.30	.02	.81	.77	.09	.16	.06
129	.65	.03	.99	.66	.85	.07	.53	.99	.36	.92	.97	.49
130	.88	.02	.50	.28	.09	.23	.00	.83	.65	.07	.10	.07
131	.72	.41	.61	.54	.84	.68	.45	1.00	.36	.37	.64	.43
132	.40	.07	.35	.21	.17	.01	.01	.04	.30	.10	.25	.05
133	.58	.84	.96	.55	.98	.73	.39	.90	.47	.28	.67	.83
134	.74	.02	.71	.35	.16	.32	.11	.88	.44	.14	.31	.18
135	.73	.48	.69	.62	.73	.06	.47	.31	.84	.91	.56	.73
136	.86	.02	.38	.05	.10	.01	.01	.35	.01	.09	.29	.03

7. Indices of Implemented Coverage

POPULATION A

7.1 Content Totals

System	000	400	100	200	300	MEANS
HUN	.92	.97	.91	.87	.87	.91
SWA	.85	.92	.87	.80	.83	.85
JPN	.85	.95	.83	.51	.75	.77
THA	.85	.86	.82	.57	.53	.74
FRA	.86	.92	.87	.44	.51	.73
CON	.87	.83	.70	.51	.60	.71
NGE	.79	.71	.73	.64	.64	.71
NTH	.82	.83	.72	.66	.32	.70
CBC	.86	.75	.83	.50	.48	.68
ENW	.78	.79	.64	.54	.69	.68
USA	.84	.74	.67	.44	.70	.68
NZE	.68	.70	.64	.60	.60	.64
ISR	.70	.63	.79	.43	.52	.62
BFL	.77	.83	.74	.31	.38	.61
FIN	.75	.70	.70	.38	.51	.61
LUX	.79	.82	.51	.35	.37	.58
SWE	.66	.68	.44	.36	.47	.52
MEAN	.81	.80	.73	.52	.57	.69
N. ITEMS	46	24	30	39	18	157

KEY:
000 = Arithmetic
100 = Algebra
200 = Geometry
300 = Statistics
400 = Measurement

7.1.1 000 Arithmetic
(No items for 007)

System	002	009	003	005	001	006	004	008	MEANS
HUN	.99	1.00	.99	.96	.90	.76	1.00	.40	.92
CON	.95	.93	.91	.84	.81	.87	.86	.74	.87
CBC	.96	.88	.90	.81	.79	.97	.85	.66	.86
FRA	.97	.87	.94	.96	.80	.98	.93	.11	.86
JPN	.91	.99	.97	.98	.79	.78	.97	.00	.85
SWA	.96	1.00	.92	.89	.90	.76	.75	.42	.85
THA	.96	.82	.93	.80	.79	.85	.91	.42	.85
USA	.94	.88	.90	.76	.76	.85	.88	.59	.84
NTH	.95	.97	.87	.83	.80	.73	.69	.69	.82
NGE	.78	.80	.81	.67	.76	.90	.79	.82	.79
LUX	.87	.93	.88	.84	.72	.77	.73	.63	.79
ENW	.90	.92	.82	.79	.76	.68	.70	.60	.78
BFL	.94	.83	.79	.84	.81	.83	.72	.09	.77
FIN	.96	.93	.82	.66	.80	.86	.56	.07	.75
ISR	.77	.74	.74	.72	.65	.74	.71	.48	.70
NZE	.87	.85	.72	.78	.73	.57	.46	.31	.68
SWE	.78	.93	.90	.53	.70	.28	.57	.03	.66
MEAN	.91	.90	.87	.80	.78	.78	.77	.42	.80
N. ITEMS	8	1	10	3	10	3	8	3	46

KEY:

001 = Natural Numbers
002 = Common Fractions
003 = Decimal Fractions
004 = Ratio, Proportion, Percent
005 = Number Theory
006 = Exponents
007 = Other Number Systems
008 = Square Roots
009 = Dimensional Analysis

7.1.2 200 Geometry
(No items for 210,211,213,214)

System	201	207	202	203	208	212	209	204	206	205	215	MEANS
HUN	1.00	.96	.99	1.00	1.00	.75	.99	1.00	.43	.84	.24	.87
SWA	.97	.99	.91	.79	.84	.83	.92	.70	.37	.50	.29	.80
NTH	.89	.89	.72	.74	.74	.63	.75	.20	.61	.34	.22	.66
NGE	.84	.56	.77	.66	.73	.38	.52	.66	.69	.62	.43	.64
NZE	.86	.74	.78	.65	.63	.30	.68	.30	.29	.18	.28	.60
THA	.93	.53	.70	.85	.69	.40	.31	.57	.39	.30	.13	.57
ENW	.81	.64	.68	.46	.53	.44	.42	.43	.55	.16	.21	.54
JPN	.65	.83	.70	.38	.41	.81	.39	.19	.01	.67	.14	.51
CON	.81	.51	.63	.66	.59	.24	.29	.52	.45	.13	.22	.51
CBC	.75	.70	.59	.76	.49	.24	.18	.49	.75	.11	.10	.50
FRA	.79	.57	.35	.33	.23	.53	.33	.36	.04	.79	.41	.44
USA	.75	.53	.50	.62	.41	.21	.17	.52	.54	.06	.07	.44
ISR	.64	.71	.51	.51	.38	.32	.18	.29	.43	.15	.06	.43
FIN	.56	.70	.41	.37	.33	.23	.35	.23	.03	.30	.12	.38
SWE	.67	.56	.44	.69	.42	.18	.06	.12	.05	.15	.05	.36
LUX	.79	.35	.45	.26	.32	.34	.05	.29	.26	.25	.07	.35
BFL	.71	.22	.27	.13	.16	.61	.14	.44	.05	.17	.29	.31
MEANS	.79	.65	.61	.58	.52	.44	.40	.43	.35	.34	.20	.52
N. ITEMS	5	5	8	3	2	2	4	3	2	1	4	39

KEY:

201 = Classification of Plane Figures
202 = Properties of Plane Figures
203 = Congruence of Plane Figures
204 = Similarities of Plane Figures
205 = Geometric Constructions
206 = Pythagorean Triangles
207 = Coordinates
208 = Simple Deductions
209 = Informal Transformations
210 = Relations in Space
211 = Solids
212 = Spatial Visualization
213 = Spatial Orientation
214 = Decomposition of Figures
215 = Transformational Geometry

7.1.3 100 Algebra
(No Items for 108,109,111,112)

System	101	102	106	105	104	110	107	103	MEANS
HUN	1.00	.98	.96	.99	.98	.48	.98	.26	.91
FRA	.99	.90	.83	.95	.87	.93	.81	.71	.87
SWA	.90	1.00	.90	.90	.90	.75	.90	.54	.87
CBC	.98	.94	.86	.68	.79	.58	.76	.73	.83
JPN	.99	1.00	.87	.91	.90	.55	.76	.10	.83
THA	.95	.95	.94	.92	.88	.12	.42	.63	.82
ISR	.91	.88	.80	.83	.83	.66	.63	.55	.79
BFL	.89	.32	.77	.83	.77	.91	.57	.37	.74
NGE	.82	.82	.72	.82	.79	.38	.54	.57	.73
NTH	.92	1.00	.79	.71	.73	.63	.38	.35	.72
FIN	.95	.99	.59	.75	.74	.78	.46	.42	.70
CON	.91	.79	.77	.70	.64	.38	.45	.57	.70
USA	.89	.84	.70	.55	.60	.45	.52	.70	.67
ENW	.79	.85	.64	.61	.64	.48	.50	.44	.64
NZE	.91	.93	.61	.63	.60	.81	.46	.25	.64
LUX	.72	.65	.52	.48	.47	.77	.34	.21	.51
SWE	.66	.95	.50	.31	.38	.18	.24	.24	.43
MEANS	.89	.87	.75	.74	.74	.58	.57	.45	.73
N. ITEMS	5	1	8	2	8	1	3	2	30

KEY:

101 = Integers
102 = Rationals
103 = Integer Exponents
104 = Formulas
105 = Polynomials
106 = Equations/Inequalities
107 = Relations and Functions
108 = Systems of Linear Equations
109 = Finite Systems
110 = Finite Sets
111 = Flowcharts and Programming
112 = Real Numbers

7.1.4 300 Statistics
(No items for 305,307,308,309)

System	304	303	302	301	306	MEANS
HUN	.99	.93	.84	.36	.31	.87
SWA	.89	.85	.85	.80	.20	.83
JPN	.89	.85	.58	.45	.06	.75
USA	.86	.65	.73	.33	.40	.70
ENW	.81	.66	.68	.39	.40	.69
NGE	.69	.66	.56	.41	.63	.64
NZE	.70	.52	.68	.38	.45	.60
CON	.80	.52	.59	.36	.30	.60
THA	.57	.60	.48	.34	.13	.53
ISR	.66	.52	.45	.24	.18	.52
FIN	.69	.46	.53	.21	.05	.51
FRA	.62	.48	.63	.09	.10	.51
CBC	.66	.40	.46	.18	.20	.48
SWE	.58	.48	.43	.25	.07	.47
BFL	.57	.25	.40	.22	.34	.38
LUX	.51	.38	.25	.13	.06	.37
NTH	.42	.30	.26	.23	.17	.32
MEAN	.70	.56	.55	.32	.24	.58
N. ITEMS	1	7	3	6	1	18

KEY:

301 = Data Collection
302 = Organization of Data
303 = Representation of Data
304 = Interpretation of Data
305 = Combinatorics
306 = Outcomes/Events
307 = Counting of Sets
308 = Mutually exclusive Events
309 = Complementary Events

7.1.5 400 Measurement

System	401	403	402	404	MEANS
HUN	.95	.98	.96	.99	.97
JPN	.98	.87	.94	.96	.95
FRA	.88	.88	.90	.96	.92
SWA	.97	.93	.95	.88	.92
THA	.85	.91	.77	.91	.86
BFL	.86	.78	.76	.87	.83
NTH	.93	.83	.83	.77	.83
CON	.92	.92	.85	.75	.83
LUX	.87	.74	.63	.92	.82
ENW	.84	.79	.84	.74	.79
CBC	.85	.79	.81	.65	.75
USA	.78	.82	.76	.69	.74
NGE	.81	.71	.59	.73	.71
FIN	.90	.79	.77	.53	.70
NZE	.85	.61	.79	.60	.70
SWE	.91	.74	.78	.48	.68
ISR	.67	.64	.60	.63	.63
MEAN	.87	.81	.80	.77	.80
N. ITEMS	5	3	6	10	24

KEY:
401 = Standard Units
402 = Estimation
403 = Approximation
404 = Areas, Volumes, Etc.

POPULATION B

7.2 Content Totals

System	300	500	200	700	100	400	600	MEANS
JPN	1.00	.94	.82	.99	.95	.85	.82	.91
NZE	.92	.94	.88	.51	.85	.68	.86	.85
FIN	.92	.88	.88	.83	.88	.72	.85	.85
BFL	.92	.89	.78	.63	.91	.79	.44	.83
SWE	.90	.88	.87	.89	.62	.61	.81	.81
ENW	.87	.88	.74	.65	.54	.64	.71	.78
THA	.78	.66	.75	.92	.79	.62	.91	.71
CON	.83	.83	.60	.39	.62	.52	.33	.68
USA	.89	.58	.81	.55	.83	.54	.46	.67
HUN	.86	.58	.81	.55	.83	.54	.46	.64
ISR	.72	.79	.64	.56	.38	.43	.30	.63
CBC	.83	.35	.74	.10	.66	.44	.28	.52
MEAN	.87	.78	.76	.74	.71	.62	.59	.74
N. ITEMS	25	46	19	4	7	28	7	136

KEY:

100 = Sets and Relations
200 = Number Systems
300 = Algebra
400 = Geometry
500 = Elementary Functions and Calculus
600 = Probability and Statistics

7.2.1 100 Sets and Relations
(No Items for 101, 103, 105)

System	102	104	MEANS
JPN	.99	.93	.95
BFL	.95	.89	.91
FIN	.96	.85	.88
NZE	.94	.81	.85
USA	.93	.79	.83
THA	.92	.75	.79
CBC	.76	.62	.66
SWE	.58	.65	.63
CON	.41	.71	.62
ENW	.70	.48	.54
HUN	.12	.56	.43
ISR	.25	.43	.38
MEAN	.71	.71	.71
N. ITEMS	2	5	7

KEY:
101 = Set Notation
102 = Set Operations
103 = Relations
104 = Functions
105 = Infinite Sets

7.2.2 200 Number Systems

System	204	203	201	202	205	MEANS
FIN	.98	.87	.89	.80	.88	.88
NZE	.96	.92	.93	.80	.86	.88
SWE	.99	.87	.72	.74	.98	.87
JPN	1.00	.94	.98	.97	.48	.82
USA	.93	.85	.88	.72	.75	.81
BFL	.95	.65	.95	.56	.81	.78
THA	.95	.61	.83	.78	.68	.75
CBC	.97	.90	.79	.63	.60	.74
ENW	.97	.83	.67	.66	.68	.74
ISR	.97	.70	.52	.70	.46	.64
CON	.95	.81	.65	.59	.30	.60
HUN	.98	.87	.54	.75	.08	.56
MEAN	.97	.82	.78	.78	.63	.76
N. ITEMS	3	3	3	4	6	19

KEY:

201 = Laws for Number Systems
202 = Natural Numbers
203 = Decimals
204 = Real Numbers
205 = Complex Numbers

7.2.3 300 Algebra
(No items for 307)

System	303	301	302	305	304	306	MEANS (Wtd.)
JPN	.99	.99	.99	1.00	1.00	.99	1.00
BFL	.99	.93	.95	.88	.85	.97	.92
FIN	.99	.99	.98	.93	.90	.07	.92
NZE	.98	.94	.99	.89	.86	.93	.92
SWE	.97	.92	.85	.93	.94	.08	.90
USA	.99	.92	.86	.89	.84	.46	.89
ENW	.93	.89	.90	.84	.85	.62	.87
HUN	.99	.80	.82	.93	.91	.01	.86
CBC	.98	.88	.83	.81	.77	.12	.83
CON	.97	.82	.82	.86	.78	.33	.83
THA	.92	.78	.66	.80	.70	.71	.78
ISR	.94	.65	.83	.65	.73	.03	.72
MEANS	.97	.88	.87	.87	.84	.44	.87
N. ITEMS	5	6	2	5	6	1	25

KEY:
- 301 = Polynomials
- 302 = Quotients of Polynomials
- 303 = Roots and Radicals
- 304 = Equations and Inequalities
- 305 = Systems of Equations/Inequalities
- 306 = Matrices
- 307 = Groups, Rings, Fields

7.2.4 400 Geometry
(No Items for 402, 404, 407, 408)

System	401	406	403	405	409	MEANS (WTD.)
JPN	.99	.98	.96	.78	.53	.85
BFL	.94	.86	.78	.81	.63	.79
FIN	.97	.93	.87	.71	.14	.72
NZE	.96	.87	.64	.62	.51	.68
HUN	.97	.85	.72	.64	.17	.65
ENW	.91	.88	.70	.58	.23	.64
THA	.56	.79	.64	.73	.24	.62
SWE	.91	.86	.63	.67	.10	.61
USA	1.00	.85	.64	.36	.08	.54
CON	.97	.78	.61	.29	.17	.52
CBC	.79	.79	.51	.23	.03	.44
ISR	.72	.84	.52	.07	.04	.43
MEANS	.89	.86	.69	.54	.24	.62
N. ITEMS	1	9	6	7	5	28

KEY:

401 = Euclidean Geometry
402 = Affine/Projective
403 = Analytic Geometry
404 = Three-dimensional Geometry
405 = Vector Methods
406 = Trigonometry
407 = Finite Geometries
408 = Elements of Topology
409 = Transformational Geometry

7.2.5 500 Elementary Functions/Calculus
(No Items for 509, 510)

System	501	502	503	508	505	506	504	507	MEANS
JPN	.95	.98	.96	.98	.94	.87	.91	.88	.94
NZE	.90	.94	.95	.96	.93	.97	.99	.98	.94
BFL	.92	.96	.86	.92	.83	.90	.89	.90	.89
FIN	.92	.96	.93	.94	.80	.93	.79	.77	.88
ENW	.92	.83	.72	.95	.84	.91	.95	.96	.88
SWE	.91	.91	.97	.99	.82	.89	.82	.63	.88
CON	.81	.83	.80	.88	.81	.84	.84	.77	.83
ISR	.87	.86	.93	.72	.76	.70	.81	.56	.79
HUN	.81	.73	.78	.93	.68	.55	.19	.46	.68
THA	.77	.72	.91	.24	.72	.51	.67	.62	.66
USA	.80	.92	.71	.35	.51	.37	.42	.31	.58
CBC	.74	.73	.42	.06	.21	.06	.10	.04	.35
MEAN	.86	.86	.83	.74	.74	.71	.70	.66	.78
N. ITEMS	11	4	4	5	10	6	4	2	46

KEY:

501 = Elementary Functions
502 = Properties of Functions
503 = Limits/Continuity
504 = Differentiation
505 = Application of the Derivative
506 = Integration
507 = Techniques of Integration
508 = Applications of Integration
509 = Differential Equations
510 = Sequences/Series of Functions

7.2.6 600 Probability and Statistics (No Items for 604, 605)

System	602	601	603	MEANS (WTD.)
THA	.95	.90	.85	.91
NZE	.91	.79	.94	.86
FIN	.86	.86	.77	.85
JPN	.80	.98	.44	.82
SWE	.82	.88	.56	.81
ENW	.76	.75	.44	.71
USA	.62	.40	.15	.46
BFL	.47	.52	.14	.44
CON	.47	.24	.16	.33
ISR	.36	.27	.21	.30
CBC	.55	.06	.14	.28
HUN	.55	.06	.04	.26
MEANS	.68	.56	.40	.59
N. ITEMS	3	3	1	7

KEY:
601 = Probability
602 = Statistics
603 = Distributions
604 = Statistical Inference
605 = Bivariate Statistics

7.2.7 700 Finite Mathematics

System	701	MEANS (WTD.)
JPN	.99	.99
THA	.92	.92
SWE	.89	.89
FIN	.83	.83
ENW	.65	.65
BFL	.63	.63
ISR	.56	.56
USA	.55	.55
NZE	.51	.51
CON	.39	.39
HUN	.29	.29
CBC	.10	.10
MEANS	.74	.74
N. ITEMS	4	4

KEY:
701 = Combinatorics